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MINING RECORDS  
OF  
SOUTH AUSTRALIA.

HENRY Y. L. BROWN, F.G.S.,

GOVERNMENT GEOLOGIST.

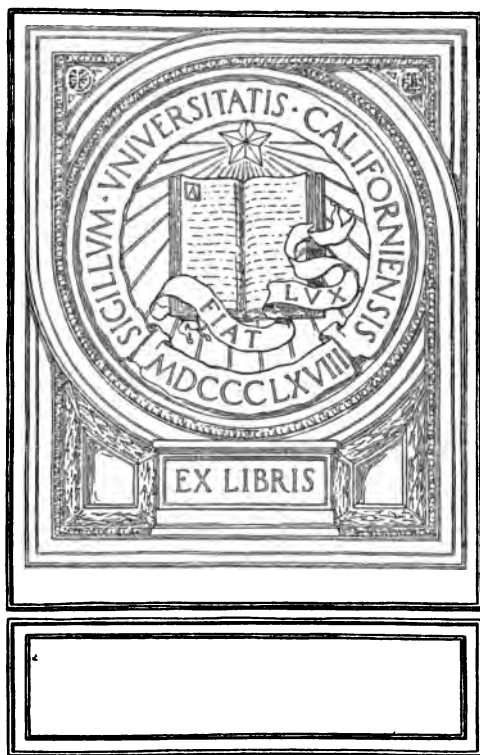
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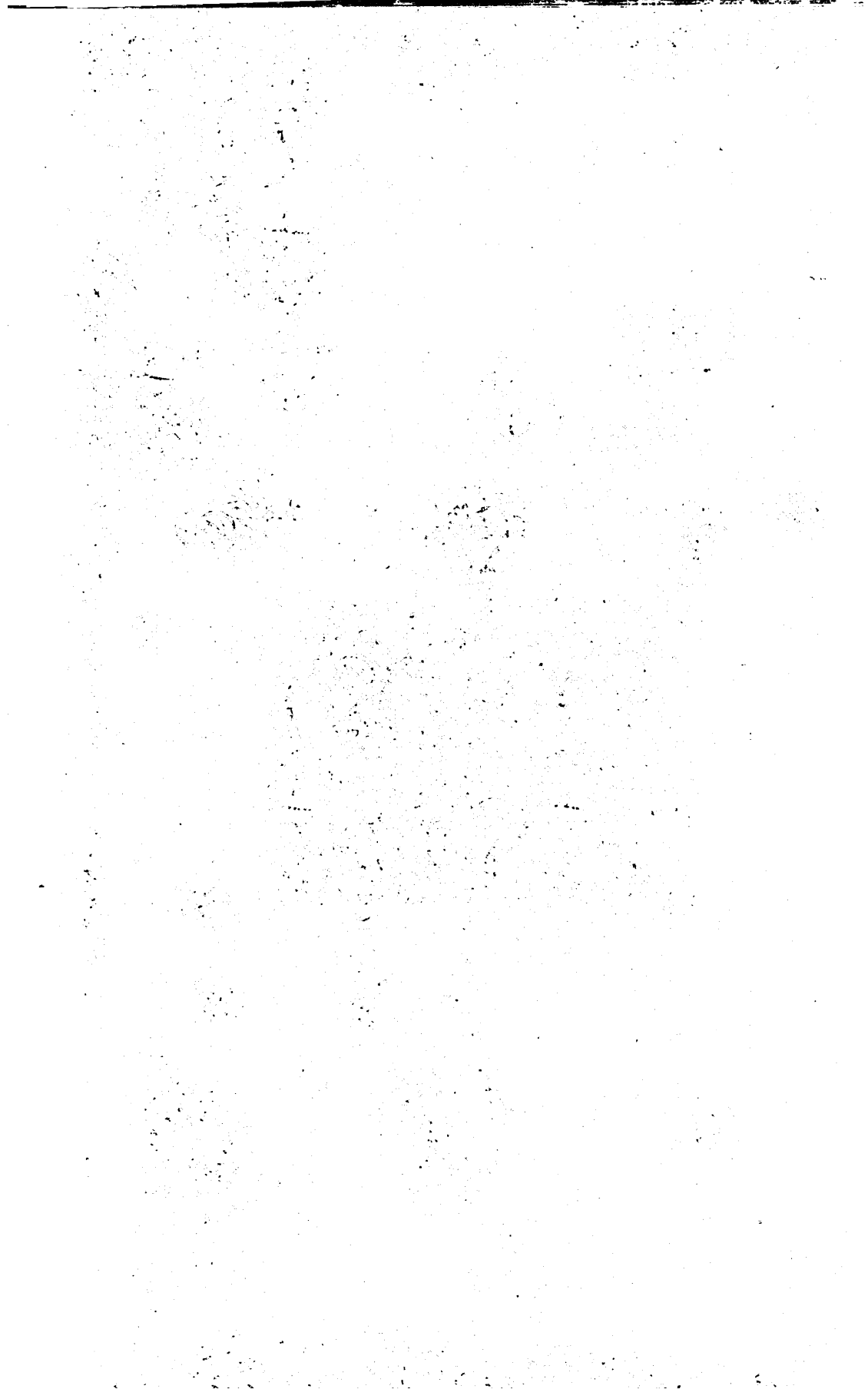
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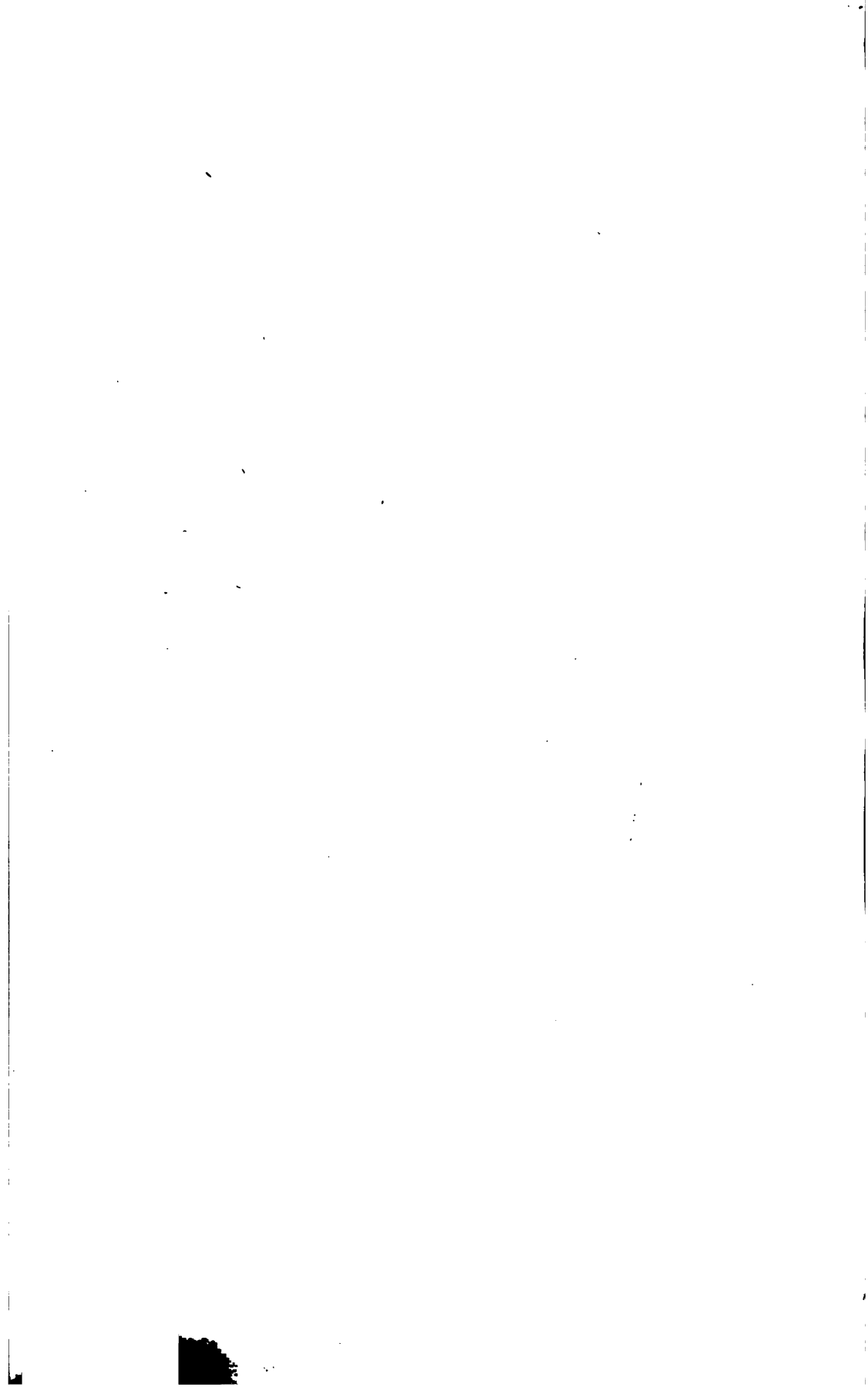
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# RECORD OF THE MINES OF SOUTH AUSTRALIA.

UNIV. OF  
CALIFORNIA

*Prepared under the authority of the Hon. the Commissioner of  
Crown Lands and Immigration,*

BY

HENRY Y. L. BROWN, F.G.S.,

GOVERNMENT GEOLOGIST.

SPECIALY PREPARED FOR THE MINING EXHIBITION:

Adelaide :

PRINTED BY H. F. LEADER, GOVERNMENT PRINTER, NORTH-TERRACE.

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TO VIRAL  
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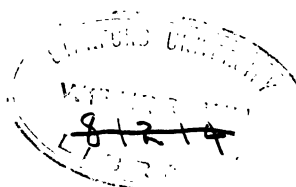
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## PREFACE.

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AN Official Record of the Mines of South Australia was published in 1887, for the purpose of drawing attention to the large mineral resources of this province, and an industry that has been carried on for years intermittently rather than systematically. The true value of our mineral deposits has not yet been realised; but the enormous productiveness of the Barrier silver-lodes, situated only a few miles from the boundary line which divides South Australia from New South Wales, and the fact that, practically, they are worked from and through this province, has led to the development of new energy in mining pursuits within our own borders. This circumstance, and the proposal for a Mining and Metallurgical Exhibition in the Crystal Palace, London, to be held in July next, warrant the issue of a second edition of the work. In this an effort has been made to present a catalogue and a history of the mines and prospecting enterprises which now are in existence, or have had an existence, with all the information available. This has, to a very large extent, been supplied by mine managers, secretaries, or directors, personally interested in the undertakings, or by the official reports of the Inspector of Mines and the Government Geologist. In other instances information has been gleaned with no little trouble from documents which detail the earlier efforts made for the development of the mineral wealth of the country. It is to be regretted that the information supplied in respect of many of the undertakings is only meagre, a circumstance due not to the lack of effort, but to apathy in response on the part of those to whom application has been made. To those gentlemen who have promptly placed at the disposal of the compiler valuable information most grateful acknowledgment is made; and in all instances, where possible, the names of persons supplying data have been given in the reports. It is obvious that in the light of full information the public will run fewer risks of being drawn into "bogus" ventures, whilst legitimate mining enterprise will be encouraged, to the great advantage of all investors. These considerations, and the hope of assisting those who are devoting their capital and their energies to the development of our mineral resources, demand the presentment of as complete a statement of fact as possible. It must, at the same time, be

remembered that this book does not pretend to be other than a work of reference, and the necessity for condensation has compelled the use of the utmost brevity in all its descriptions. Besides which, as the book has been specially prepared for the Mining Exhibition on short notice and necessarily in haste, allowance must be made for any inaccuracies or omissions that may be noted. The work of collection, revision, and arrangement of details has been performed by Mr. E. H. Derrington, in the very short space of time available; and to him has been committed the task of seeing these pages through the press. The present edition numbers 10,000 copies, which the Government propose to distribute principally through the agency of the Mining Exhibition referred to, providing also for requirements in the colonies. In this way they will endeavor to convey information to English capitalists and others financially interested in our mines, and also afford an opportunity for the general public to acquire some knowledge of the extent to which this country may claim to be regarded as having a great mining future before it.

HENRY Y. L. BROWN,

GOVERNMENT GEOLOGIST.

Adelaide, May, 1890.

## INTRODUCTION.

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THE province of South Australia celebrated the fiftieth anniversary of the date of its foundation in December, 1886. In respect of development of resources therefore its youthfulness forbids comparison with older and well-established countries, and yet that development is regarded as evidencing phenomenal progress, considering the extent of the population, and the fact that so large a portion of its work has consisted of pioneering settlement. But the development has been so far merely the indication of future possibilities, and nowhere is there any sign of maturity. Already several of the chief products of this country have become celebrated, but as yet little if anything is known of many of its mineral deposits. Excepting in a few notable instances, mining has been carried on desultorily and ineffectively, sometimes with a little enthusiasm, followed by a depression proportioned to the extravagance of large expectations; but never with such steady perseverance, as might reasonably have been expected in regard to an industry calculated to win great wealth and support a large population. Very recently the Government has resolved on a fuller recognition of this important pursuit, and has taken the necessary preliminary steps for official oversight; and in the successful establishment of a School of Mines there is warrant for the expectation that in the future South Australian mining will be conducted with greater attention to method, and on a more scientific basis than has been possible heretofore. Since the appointment of an Inspector of Mines, in January, 1889, a great deal of work has been done which should make the eventual organization of a mining department a natural sequence. Further, the Legislature has wisely endeavored to promote legitimate mining by liberalising the laws affecting the industry, and by removing some disabilities which have appeared to prevent its progress. The right to mine on private property under the "Mining on Private Property Act, 1888," makes unworked auriferous land accessible to the *bond fide* gold prospector under equitable conditions recognising the rights of owners; and it is believed that large results will accrue from this concession. There yet remains one great difficulty to be overcome in the fact that the gold found in this province is usually very fine, and disseminated in such minute particles as to make its complete extraction from the matrix and associated ores, principally pyrites, a matter of apparent impossibility. This, of course, results at present in great loss, and there will be a new era of prosperity secured to gold mining when cheap and effective appliances are invented which will make bulk treatment produce the precious metal in quantities approximating to the percentages obtained by assays of mere samples. This technical difficulty overcome, it may fairly be assumed that South Australia and our Northern Territory will rank high among the gold-producing countries of the world, and that their prosperous future will be assured.

It may be appropriate to present to the reader a short historical sketch of our mining industry in this portion of the "Records," so that our chronicles may be made complete as far as may be possible.

The first mine opened in this province was situated on a western flank of the Mount Lofty Range, four miles south-east of Adelaide, in the immediate vicinity of a picturesquely-situated village, known as Glen Osmond. Rich specimens of galena were observed strewing the surface of the ground, and, in 1841, five years only from the date of the proclamation of the province as an appanage of the British Crown, the silver-lead veins of the Wheal Gawler were opened, and worked with very primitive appliances. For a time, anticipations of success stimulated the adventurers; but ere long it was found that expenses exceeded profits, the result being a suspension of operations. But in 1844, the property being then leased to a small company, operations were resumed. Other prospectors also set to work in the immediate neighborhood on metalliferous outcrops, and a little later, smelting works were established, the ruins of which have for years attested the enterprise of these pioneer miners. Again it was found that profits did not overtake the very considerable outlay, and mining in that neighborhood was abandoned, long before the value of the lodes had been ascertained. After the lapse of many years, during which time the properties lay unworked, the several mines in the locality were recently re-opened, and good marketable ores have been raised. The results, however, are not yet such as to prove remunerative to the shareholders, and, the available capital being very small, it is feared that these undertakings will not be carried on to proper development.

The Kapunda Copper Mine, opened in 1842, at a place about fifty miles north of Adelaide, and which yielded a fortune to its first possessors, heralded other discoveries, some of considerable promise. Thus, there was the Montacute Mine, opened in 1843, in the hills a little north-east of Adelaide, and from it a large output was obtained for a considerable number of years.

Two years later (1845) the discovery of the well known Burra Mine was the fortunate episode in the life of a lonely shepherd named Pickitt, and the true "red-letter day" in the history of the then struggling colony. The capital invested in this venture was £12,320 in £5 shares, and the mine proved so rich that no second contribution from the shareholders was found necessary. For some time, at one period of its unique history, the fortunate holders of its scrip received £40 per annum in dividends on each £5 share, and the estimated value of these was £200, or forty times the original price. After this magnificent venture had paid in dividends £800,000, its owners sold their prize to a new company, by whom it has now for a great number of years been suffered to lie idle. It is understood that efforts have been made locally to negotiate for the property, with a view to re-opening the workings, but there has been a failure in the arrangement of terms; and pending some favorable alteration in the price of copper, it may be presumed that the mine, formerly the busy rendezvous of hundreds of miners, will remain unworked.

It was not until the year 1860 that the success attending the working of the Burra Mine was repeated in part at the Wallaroo Mine, the products of which have given a special character to the copper produce of the province. The Moonta Mines

discovery was made in 1863, under somewhat remarkable circumstances, and it attracted a vast amount of interest, none the less that there were rival claimants for the property. The enormous yields of copper ore that have been obtained year after year from these two mines, without exhausting their cupriferous deposits, attest their wonderful character. And now, after the lapse of a quarter of a century, during which period they have never absolutely ceased working, they are still carried on in a healthy condition, despite the fact that the copper market has been at times wonderfully adverse, and has remained for the last few years in a depressed condition. Whilst these pages are passing through the press arrangements are in progress for the amalgamation of these two large undertakings, to be in future conducted under one management.

The list of other copper discoveries, especially in the more northerly regions of the province, is too extensive to enumerate in this section of the work, but the Mutooroo stands out distinctively as a highly successful undertaking. Its ores are remarkably rich, yielding a very high percentage of copper, and specimens have been forwarded to the Exhibition which will fully illustrate the valuable character of the mine. It is noteworthy that the management has never hitherto made a call, and yet has paid no less a sum than £12,000 in dividends. Details of the several mines will be found in their proper order.

The notable silver-lead mine, the Talisker, was discovered near Cape Jervis in 1862, and after being worked for ten years was stopped for lack of funds. It was one of the most productive of the mines of its class. The net proceeds of the ore raised, which ranged from £27 to £39 per ton, was £27,846. The silver averaged from 62oz. to 91oz. per ton, and sold at 5s. 4½d. to 5s. 6d. per ounce, whilst the lead realised in London £16 to £22 per ton.

Enough has been said to indicate that South Australia is a country singularly rich in minerals. And there are many persons who have confident belief in her gemfields also. It is beyond dispute that diamonds have been found in the gold-bearing drifts at Echunga; and it has been stated that they have also been found in conjunction with the deposits of garnets in the Hale River district.

In view of all the circumstances, it may be asked—Why is not South Australia a great mining country? The answer is not far to seek. We have hitherto as a community had very little accumulated capital awaiting employment, as frequently is the case in older countries; all our financial resources are usually strained in compassing trade requirements, and we can, as a rule, invest in mining only by withdrawing money from ordinary business channels. Consequently, the majority of our mining adventures are floated upon such a limited nominal capital, represented principally by that curse of mining enterprise “paid up shares,” and with so very small a modicum of hard cash, that funds give out ere the “find” has been really tested. Pressure of the slightest kind hastens collapse: the mine stops, the liquidator steps in, and only promoters (who all along have run little risk) come out unscathed. It may be hoped that in process of time, when the capitalists of other countries begin to comprehend the value of our mines, this evil will remedy itself, and there will be a new era of development, with proportionate advantage to the community and those engaged in the industry.

With these preliminary remarks, we at once proceed to an enumeration of our mines, including, not only those which have continued vigorously working up to the date of this edition, but those also that have been at work at earlier or later periods, and from various causes have ceased to be operative.

## MINING RECORDS

OF

## SOUTH AUSTRALIA.

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COPPER.

**ADELAIDE MINING COMPANY**, formed in 1846, to work a property situated twelve miles N.E. by E. of Adelaide, section No. 5526, hundred of Onkaparinga, near the Victoria gold mine. About 70 tons of ore were raised ere the men abandoned the mine, and joined the rush to the Victorian gold diggings, in 1851-2. There are eight or nine lodes, nearly vertical, or having a very slight underlay to the westward. In some places the lodes come together and form large bunches of quartz and copper-ore. They bear S.W. and N.E., and vary in width from about 6in. to 6ft. The ores consist of carbonates and grey and yellow copper-ore, associated, in some instances, with silver and gold. A few years ago 5 tons of ore, taken from a lode a little to the east of the old workings, yielded 22½ per cent. of fine copper. The country rock is chiefly slate, traversed by bands of hard rock. Noticeable features in the workings are the great number of shallow drives, the number of parallel lodes that have been struck, and the fact that they all carried ore more or less near the surface. The area of the old workings forms but a small portion of the Adelaide Mine section.

**AGERY MINE.**—This was a discovery situated about twelve miles S.E. of Moonta, and two prospecting shafts were sunk on no stronger indications than a sparry outcrop. The work was soon stopped, and the land subsequently fell into the hands of agriculturists.

**ALBION MINE**, adjacent to the Paramatta Mine. An unsuccessful attempt was made by a joint stock company to cut the Paramatta lodes, but after expending a considerable amount in sinking shafts the venture was abandoned.

**ALL NATIONS MINE** is one of the Burra group, and was worked by a Melbourne company. No record of results. (1867.)

**ANGASTON.**—Prior to 1846 two copper lodes were discovered on a section close to Angaston in the valley of the River Gawler. One was traced a distance of 200 yards, and from samples of ore taken from it 33 per cent. of copper is said to have been obtained by assay. This district has the appearance of being rich in deposits of copper ore, but no evidence is to hand showing any attempt to develop the lodes.

**ANSTAY'S MINE (MUKURTA COPPER MINE)** near the sources of the Torrens, on the Highercombe property. Strike nearly E. and W. Ore occurred in bunches in a gossany lode 2ft. to 4ft. wide. No records. (1846.)

**APEX HILL MINE**, 176 miles N.N.E. of Port Augusta, Mount Lyndhurst district, is situated in rather rough hilly country. A lode running about N.E. and S.W. is traceable for about 150 yards on the surface, its back consisting of ironstone, with



quartz and copper ore. The country is quartz and clayslate. Stains of copper are found in places away from the lode; thus there are very strong green stains on the face of a precipitous rocky hill at one side of the creek, while the hill on the opposite side is covered with blue stains. The ore in the lode, not very rich, looks promising, and consists of green and blue carbonate, with a little grey ore. What it may prove in depth it is impossible to say, the ground not having been opened. (Austin, 1863.)

**APPEALINA MINE.**—Three miles N.E. of the above place and west of Mount Carnarvon, is reported to contain a fairly defined lode of grey ore and green carbonates. A shaft 50ft. deep was sunk, and fine specimens of native copper were got. Dioptase, or silicate of copper, is found here. The surrounding country consists of dark-blue flags and slates, with bands of hard blue rock, dense and compact, which dip south, 20° west, at an angle of 15° to 30°. The lode is accompanied by a bed of hard breccia or conglomerate, with fragments of various rocks, and contains a great deal of iron pyrites. (1859.)

**ARKAROOA.**—One of three mineral claims in the neighborhood of Woottana. The copper does not make in depth in anything like payable quantities, and prospects are not sufficient to encourage further sinking.

**ARNO BAY or WINDITTIE MINE** is four miles S.W. of Wangaraleednie station and about eighty miles N.E. of Port Lincoln. A shaft has been sunk to a depth of 100ft. No further information obtainable.

**AROONA** (sometimes called Parara).—This property consisted of four sections, not far from Moonta mines, adjoining the Yelta mine, taken up by a small prospecting company, who costened on all the four sections, and sank a shaft to a depth of five or six fathoms on what was believed to be an extension of one of the Moonta lodes. But, though the indications were excellent, the capital of the adventurers failed in sufficiency, and the workings ceased years ago.

**ATLAS MINE.**—During the excavation of a cutting on the tramway from Moonta to Wallaroo a lode was discovered embedded in limestone, and a small company, with very limited capital, commenced working. A trial to a depth of about 3 fathoms in hard ground abated the zeal of the adventurers, and the copper market falling, an early collapse of the undertaking resulted.

**AUSTRALIAN MINING COMPANY**, established in London in 1845, with a subscribed capital of £400,000, in 20,000 shares of £20 each, of which (in 1847) £40,000 were paid up. Their principal properties were at Tungkillo, Reedy Creek (thirty-four miles north-easterly from Adelaide), and at Charlton (fourteen miles south of Mount Remarkable). (For particulars of mines, see CHARLTON and TUNGKILLO.)

**BALD HILL DISCOVERY.**—This prospect was opened some years back on account of favorable indications on the surface not far north of the Moonta mines, but nothing was done beyond a slight amount of costeneing work.

**BALHANNAH COPPER MINE.**—(See under "GOLD.")

**BAROSSA COPPER MINE** was at one time the property of the Royal Mining Company. It is situated twenty-two miles N.E. of Adelaide. There is no information as to work done upon it. (1856.)

**BASHAM'S PROSPECT.**—(See "SILVER.")

**BELTANA COPPER MINE** was opened by a small company, who sent a few tons of ore away, but the smallness of the capital raised prevented the mine from being

properly worked. The mine lies in low ranges about eighteen miles west of Beltana station, and half-way between the southern end of the Mount Deception Range and Lake Torrens. The ore deposit is represented by a thin zone of soft arenaceous shales impregnated with and enclosing small patches and nodular pieces of atacamite. The deposit dips apparently at an angle of  $20^{\circ}$  to  $25^{\circ}$  northward, underneath a thick bed of hard limestone forming the flat top of a low hill. The workings lying on the southern slope of this hill consist of four openings, two of which are mere shallow excavations and the third an underlay shaft of about 16ft. deep with a crossdrive. The fourth is also an underlay shaft about 60ft. in depth. The shales exposed are very soft and full of streaks and concretionary masses of impure brown iron ore, with seams and cavities full of crystalline coatings of atacamite. Besides these, small patches and veins of gypsum occur, and angular irregular masses of cavernous quartz, the hollows of which are mostly occupied by atacamite in fine acicular crystals, associated occasionally with carbonate of lead. The prospects of this mine do not appear to warrant any great expenditure. (Ulrich, 1872.)

**BELVIDERE MINE** is situated six miles N.W. of Hamilton, on the River Light, sixty miles from Adelaide. The mine is on the north end of Peter's Hill, and was worked in 1849, but from 1853 there is no record of any work having been done. There are two shafts on the course of the lode about 450ft. apart. A lenticular shoot of ore must have been taken out. There are, says the Inspector of Mines, still some small patches of lead and copper ore showing in places. The formation is regular and continuous. The lode strikes N. and S., and underlies E. The walls are well defined, and consist of clay slate. An assay of galena taken from this mine gave silver 24oz. 16dw. and lead 77 per cent.

**BEWLEY MINE.**—West of Waukaringa. No information obtainable.

**BILLEROO MINE**, about 125 miles E.N.E. of Port Augusta, has six lodes—three parallel, two crosscourses, and a "blow." The main lode bears N.E. and S.W., and is about 24ft. wide. Eighty tons of grey ore have been sent away of a percentage varying from 28 to 75. Three shafts have been sunk, the deepest of which is 120ft.; and a drive has been put in to a length of 20ft. In one place a face of ore was met with 5ft. wide, and containing 75 per cent. of metal. The veinstone consists of quartz and gossan, and the country rock of schistose slate. The mine was opened about sixteen years ago.

**BINGO.**—This mine, adjacent to the Wallaroo Mine, belonged to the same company, and it was believed that considerable quantities of ore were obtained before reaching the 10-fathom level. There was reputedly a lode 7ft. to 8ft. wide of grey ore, trying 40 per cent. for fine copper. At greater depth the lode was lost, and never was recovered.

**BLACK KNOB.**—Locality, Arkaba; area, 160 acres. No information.

**BLACK POINT.**—Several claims were taken out, and the lode, which looked very promising, showed an outcrop below the high-watermark and extended under the sea. The discovery was not worked, but it is believed that a small proprietary has lately commenced taking out ore, said to be of good quality.

**BLINMAN MINE.**—This mine is supposed to have been found about the year 1862 by a shepherd named Blinman, who observed a great outcrop of mineral on the top of a hill, about 90ft. above a creek lying to the eastward. This mass was about 350ft. in length, nearly 100ft. in thickness in one part, and of considerable height. On being tested it proved to be rich copper ore. The mine is 272 miles north of Adelaide, and about 120 miles east of Port Augusta; it is situated in the Flinders Range, and is at an elevation of 2,000ft. above the Parachilna Plains. Area held, 640 acres.

The workings consist of a main shaft 450ft. deep, from which drives have been put in north and south, which are known as the 15, 25, 35, 50, 60, and 70 fathom levels. The longest levels northward, which are the 75, 25, 35, and 50, extend 300ft. from the shaft; southward, the longest level is the 15 fathom, which extends 250ft. The lowest, or 70 fathom level, has been driven 130ft. north, and the same distance south. The rock formations are crystalline siliceous limestone; bed rock, fine argillaceous and calcareous sandstone, quartzite, and, in some places, clay slate, having a vertical dip, and striking north and south through the mine. The copper ores, which at the lower levels consist chiefly of sulphides, are disseminated through the rock in specks, patches or pockets, strings and veins, running in an east and west direction across the rocks, and also with them, forming altogether a metal-bearing belt of strata in places 20ft. to 30ft. wide. Some of the cross veins are of considerable size, and in one or two places they are of sufficient importance to be classed as lodes. They are also richer in ore than the main ore-bearing strata which they penetrated. So far as can be seen there is no defined boundary between the ore-bearing strata and the barren rocks; in other words, the full width of ore-bearing rock has not yet been determined. By following up the rich crosscourses, or putting in crosscuts, this could be ascertained. The upper portions of the mine, from the surface to the 35 fathoms level, have been stoped out in an irregular manner—probably the bunches of richest ore were followed, leaving large cavities separated by portions of unworked ground, which contains an appreciable percentage of copper ore, and which will probably be worked at some future time. These excavations are of considerable width, in places from 15ft. to 20ft., or more, and a large quantity of ore must have been raised from them. The present workings are at the 50 fathoms level, and between that and the 70. Here, the ore is being stoped out to a width of 25ft. to 30ft., the workings more resembling those of a quarry than of a mine. The main shaft was, at the time of the Government Geologist's visit, 35ft. below the 70 fathoms level. This mine possesses one or two special advantages: as the country rock is solid and without joints, no timbering is required, and the stopes, after the removal of the ore, are left open; and all the material raised from the mine is ore-bearing, so that, with the exception of that which comes out of the shaft, no mullock has to be raised. The ore-bearing belt of strata is more or less vertical for about 300ft., and then underlies to the eastward at a high angle. The veinstone associated with the copper ores are calcspar, sulphate of barium (heavy spar), and occasionally quartz. The rocks forming the ranges, which have an elevation of 2,000ft. above sea-level, consist of alternating strata, composed of quartzose, sandstones, and shales, siliceous and dolomitic limestone, clay, and calcareous slates and flagstones, sandstones, quartz, brittle shales, and kaolinized slates and sandstones. In the neighborhood of Blinman these strata form an anticlinal arch, owing to the intrusion of igneous rocks (greenstone, eurite, &c.), which appear at the surface in a few places. In the centre of the arch the strata are vertical, and have a north and south strike, while on each side they are inclined at various angles to the westward and eastward. It is in the centre of these disturbed strata that the copper-bearing strata in which the mine is situated occur. The supply of water is small but increasing, and is likely to increase as the shaft is sunk deeper, and eventually a sufficient supply will be secured for concentrating purposes. A cross drive at right angles to and through the vertical beds would most probably increase the supply. Mr. Masey, the colonial director, has been good enough to supply the following information concerning this mine:—The value of the copper sold previous to the "seven years' drought" (about 1874), when the mine ceased working, was £250,000. In 1881 it was re-started and worked until 1884, when the fall in the price of copper took place, the output at the time being from 80 to 100 tons of 23 per cent. ore per month. In the beginning of 1889 the mine was again started, and was put into thorough working order, the output being raised to 150 tons of 23 per cent. ore per month, which was sent to the Wallaroo Smelting Works. The ordinary ore raised averages 8 per cent., and is dressed up to 23 per cent., whilst that from the crosscourses and leaders, which can readily be separated by hand-picking, averages from 30 to 40 per cent. of

copper. The number of men employed above and below, 80; expenditure in wages and general charges per month, £1,200. It may be added that whilst it is apparent from the width of the stopes between the 50 and 70 fathoms levels, that great quantities of ore were removed in former times, it is clear that there is no falling off in yield as the mine gets deeper; and I am of opinion that the strata will continue to be ore-bearing to a great depth, and that the mine is to all intents and purposes a permanent one.

Professor Geo. H. F. Ulrich, F.G.S., reporting upon this mine in 1872, speaking of the outcrop, writes:—

The deposit, as a whole, is bounded on the east by bluish and mottled shaly alates, with a very steep eastward dip, which changes, however, at a short distance further east, to about 30°. The rock on the west side is not well exposed at the surface, but apparently consists of a calcareous, ferruginous, partly brecciated sandstone, striking north 25° east, and dipping westerly at an angle of about 60° at a short distance, north and close eastward of main stock; a great irregularity is apparent in the outcrops of the rocks of the country, calcareous shales and sandstones alternating \* \* \*. The larger veins of ore traverse the stock mass at oblique, sometimes at nearly right angles, but innumerable smaller veins run intermediately and join the lower ones from all sides, whilst the stone between is more or less strongly impregnated with ore. At 40 fathoms in depth, sulphide ore (copper pyrites) makes its first appearance, and increases in quantity down to the water-level at 50 fathoms, where, in the bottom of a large pit, south of engine shaft, a fine vein of rather friable, but nearly pure copper pyrites was struck, that runs nearly east and west, and is from 1ft. to 3ft. in thickness. In this portion of the mine the deposit \* \* \* looks undoubtedly richer in ore than nearer the surface, the impregnation and veins of copper pyrites through the matrix reaching perhaps 20 to 25 per cent.

Besides the minerals already mentioned the following occur in the deposit:—Azurite (blue carbonate of copper) rarely, in small specks near the surface; reddish and black cupriferous brown iron ore, in veins and patches; a black and muddy sulphide, coating copper pyrites; very little iron pyrites; galena, in small specks; heavy spar (sulphate of baryta), in nests and irregular veins, often finely crystallised; white calcite, in thin veins and nests; aragonite, in fine druses of needle-shaped crystals; quartz, in thin seams and small patches. On the slope of the hill, in close proximity to the deposit, the rocks also enclose small nests of micaceous iron ore.

Below the water level a vein of bisulphuret ore was struck, finely disseminated through magnesian limestone; depth of shaft 70 fathoms. The ores obtained from the mine, from the surface of the 45-fathom level were azurite and chalcocite, and from this level to the deepest point, chalcopyrite prevailed—pure iron pyrites being almost absent. At the 70-fathom level a series of vughs were discovered. (James, 1886.)

Mr. E. F. Cooke says “there is but one lode running north and south, with cross courses, and nearly perpendicular down to the 50 fathom level; from there to the 70 fathom, about 1 in 5. The width of the lode ranges from 14ft. to 18ft. In the sulphurets leaders of solid ore gave about 28 per cent. of metal. The whole of the lode was full of veins of ore averaging from 2 to 5 per cent., and was capable of being dressed up to 25 per cent. The water level was slightly below the 50 fathom level. Drives to the length of 35 fathoms have been put into the carbonates on either side of the engine shaft. In sinking a winze below the 60 fathom level to meet the 70 fathom one, an immense vugh was discovered filled with water. The ore around this remarkable place is a rich sulphuret, and is coated with black oxide.

During the period when the mine was being worked by the E. & A. Copper Co., viz, from 1882 to 1885, ore to the extent of 1,860 tons was smelted.

The Inspector of Mines, after a recent visit, reported that a strong lode runs through the property, which, besides maintaining an equal percentage of copper, makes at intervals extensive deposits of ore. Thousands of tons of carbonates must have been extracted formerly, and poorer places were left unworked because of lack of water for dressing and heavy cost of transit. But the water difficulty has been in a large measure overcome, and there should be produced 150 tons of 23 per cent. copper per month, besides 40 tons of 28 per cent. carbonates. The ore brings £8 per ton above Chili bar quotations, and the cost of transit to Wallaroo and smelting charges is £4 12s. per ton, making the mine payable even at the present low price of copper,

**BLUESTONE MINE**, fifteen miles north-west of Arrowie. The copper and calcareous formations are mixed in a conglomerate form, with slugs of hematite. Two shafts have been sunk, but there is no defined lode, and there is no inducement to continue workings.

**BON ACCORD COPPER MINE** adjoins the property of the Burra Mine, that fact influencing the adventurers. The indications of copper were slight, but a large sum of money was spent, and a considerable amount of work was done. The engine-shaft was sunk to a depth of 50 fathoms, and other shafts were sunk and drives put in. Some of the spoil raised was impregnated with particles of ore, amongst which may be detected red and black oxides. (Austin, 1883.)

**BOOLCOOMATTA MINE**, forty-two miles N.E. of Mannahill. Here are four or five shafts, and many open cuttings in quartzite, mica, schist, sandstone, slate, and granite, all more or less stained with copper. As far as can be judged no defined lode has been found. The mine has been long abandoned. (1885.)

**BREADALBANE MINING COMPANY** was established 1850 to work five sections adjoining the property of the Strathalbyn Mining Company. They stopped work in 1851, leaving no records.

**BREMER COPPER MINE** is situated thirty-six miles S.E. of Adelaide, and three and a half from Callington, and takes its name from the Bremer Creek. It was discovered in 1850, and worked for several years. The surrounding country is flat, composed of clayslate, micaceous schist, and occasionally a little quartz. Mr. J. B. Austin reports that the prevailing ore is yellow sulphide, with black oxide; peacock ore is also found. The copper smelted at the works adjoining, during the time the mine was being worked, averaged 96 per cent. of pure copper, notwithstanding that the refining process was omitted. The mine was a part of the property of the Britannia Mining Company.

**BRITANNIA MINING COMPANY**, established in 1849, held 7,000 acres of land, as a mineral special survey on the Bremer Creek. The operations of the company were confined to leasing setts of its land for mining purposes. In 1852 they had nine mines in active operation on this property, viz., the Wheal Friendship, the Wheal Maria, the Wheal Prosper, the Bremer, the Tresevean, the Menkoo, and three others.

**BROUGHTON COPPER MINE** is situated on the Broughton River, distant from the Burra twenty-five miles in a direction west of north. The indications here were very promising, and some rich ore was obtained, but the country was so hard that the venture would not pay for working, and after a few months the mine was abandoned. (Austin, 1863.)

**BURRA BURRA MINE**, about 100 miles from Adelaide, a little to the east of north, was found in 1845 by a shepherd named Pickett, and is singularly situated on bald hills standing 130ft. above the surrounding country. The ores obtained from this mine have been chiefly red oxides, very rich blue and green carbonates, including malachite, and also native copper. (Austin, 1863.) The discovery of this mine, supporting, as it did at one time, a large population, marked a new era in the history of the colony. The capital invested in it was £12,320 in £5 shares, and no subsequent call was ever made upon the shareholders. The total amount paid in dividends was £800,000. After being worked by the original owners for some years the mine was sold to a new company, but during the last few years it has not been worked, owing in some degree to the low price of copper and also to the fact that the deposit then being worked apparently became exhausted. For many years the average yield was from 10,000 to 13,000 tons of ore, averaging 22 to 23 per cent. of copper. In

Mr. Conigrave's "Handbook of South Australia" it is stated that, during the twenty-nine and a half years in which the mine was worked, the company expended £2,241,167 in general expenses. The output of ore during the same period amounted to 234,648 tons, equal to 51,622 tons of copper. This, at the average price of copper, amounted to a money value of £4,749,224. The mine stopped working in 1877. In 1859 the number of men employed was 1,170. In the deeper levels regular lodes are met with, running north and south, containing very rich ore of malachite, red oxide, and grey sulphuret of copper; but above the 30 fathom level there is no appearance of lodes, the ore (malachite and carbonate) being deposited with the greatest irregularity. The blue carbonate often occurred in round nodules, with regularly formed crystals projecting from the surface. The malachite was found in the form of stalactite, in slabs incrusting fissures and irregularly-shaped masses, which had been deposited in cavities of the rocks. The country rocks are much broken and twisted, and consist of a cherty siliceous formation, crystalline white and grey limestone, blue slaty shales, and argillaceous sandstone. Just prior to the stoppage of the Burra Burra Mine, and whilst Captain Sanders was in charge, it is understood that good percentage ore was being obtained from a lode which had been opened at a comparatively shallow depth beneath the open basin whence had been quarried the enormous yield of carbonate ores. Since the cessation of all active operations it has been reported that overtures have been made to the proprietary company for reopening the mine, but it is to be presumed that no satisfactory arrangement has been arrived at, inasmuch as the mine still lies idle.

**BURRAWING MINE**, on two sections situated in the hundred of Yaranyacka, near Tumby Bay, on the west coast of Spencer's Gulf, was opened about the year 1871, and was wound up in 1874. A good deal of work was done upon it, and ore to the value of £6,338 was sold. The money expended on the property amounted to over £30,000. Assays of ore varied from 17 per cent. of fine copper, up to 37 per cent., and bismuth was present in the proportion of about  $1\frac{1}{2}$  per cent. No work of any consequence has been done in the mine since 1874, and further information is not obtainable. Country rocks, micaceous and quartzose schist and slate.

**CALEDONIAN**.—Locality, near Hawker; area, eleven 40-acre blocks. No records.

**CALLANA COPPER MINE**.—Locality, near Hergott Springs; area, three mineral claims, containing altogether 240 acres.

**CAEN BREA**.—Situated in the neighborhood of Robertstown. A strong lode, composed principally of quartz, runs through the claim north-east and south-west, underlying south-east at an angle of  $45^{\circ}$ . The lode in the bottom of a 50ft. shaft is fully 7ft. thick, with excellent walls, but the proportion of copper is too small to pay. It is stated that gold has been seen in the quartz, but samples taken and tested did not show a trace. (Inspector of Mines.)

**CHALLA**.—This was a prospecting venture, started with a view of working on the westerly extension of what was known as the Paramatta lode, near Moonta, and having as near neighbors the Wheal James and Wheal Hughes mines. There was a good deal of costeening done, and two shafts were sunk on the lodes to a depth of about 18 fathoms, when drives were put in 14 or 15 fathoms on a lode containing quartz, impregnated with mundic and streaks of yellow ore; but the lodes were not sufficiently productive to induce extension of capital, and, about 1870, the three sections were forfeited.

**CHAPPEL'S LODE**, near the Yudnamutana Mine, is a gossan lode with copper ore in siliceous limestone, with green actinolite and greenstone; strike, W.  $10^{\circ}$  S. The arenaceous limestone extends for some distance, and other limestone bars are visible. This lode is well-defined, but has not been worked. (July, 1884.)

**CHARLTON COPPER MINE**, the property of the Australian Mining Company, is situated on the Rocky river, and is fourteen miles S.E. of Mount Remarkable. Twenty thousand pounds is said to have been spent on this property without any return. The mine was not being worked when Mr. A. R. C. Selwyn, Victorian Government Geologist, visited the district in 1859. He described the ore seen in the spoil heaps as consisting almost entirely of small nodular lumps of impure blue carbonate, embedded in a rough white rock, chiefly composed of decomposed feldspar, with grains of quartz and a little mica. Several shafts were sunk.

**CHARLTON MINE**.—Locality, two miles north of Wirrabara township; area, 634 acres of freehold, the property of the Australian Mining Company, Limited. There are two lodes, which yielded blue carbonates. The influx of water stopped the working in December, 1858, and the land has since been used for grazing.

**CLIVE COPPER MINE**.—This mine is four miles from Nichol's Nob, and forty from Lyndhurst siding, on the Great Northern railway. Its proprietary hold 640 acres. In a fair proportion of the costeening pits carbonate of copper was seen by the Inspector of Mines during a recent visit, and he came to the conclusion, from the general indications, that the claims comprise a strong auriferous belt, from which large quantities of copper can be extracted at small cost. A shaft has been sunk about 40ft., and there is a strong lode showing fully 9ft. thick in places. The lode is composed of calc-spar, carrying irregular branches or deposits of high-grade copper ore. At the time of the Inspector's visit there were about 30 tons of high-grade ore at grass.

**COCKER'S CLAIM**.—Situation,  $2\frac{1}{2}$  miles from Osborne's shaft on the Mutooroo mine. Three or more lodes have been opened up in shallow costeening pits, and some high-grade copper ore has been sent away. This should eventually prove a valuable mine. (Inspector of Mines.)

**CONNEMANNA**.—A Yorke Peninsula venture, on land lying S.E. of the Prince of Wales Mine. The effort to discover a payable lode was not successful, and the adventurers contented themselves with the first outlay.

**CONSTITUTION HILL COPPER MINE** lies about four miles south of Mount Serle. It contains two outcrops of ore, which show on the northern slope of a low rise within about half a mile N.W. of the terminating point of a high spur connected with Constitution Hill. The first and most important outcrop represents a lode-like mass of a dense, brittle quartzite, which is thickly traversed in all directions by larger and smaller quartz veins, most of them, however, running in the strike of the mass. Both quartzite and vein quartz are full of small green patches, seams, and coatings of atacamite, and there are scattered larger vein-like masses and patches, which show within an earthy atacamite envelope, nuclei of dark-grey oxide of copper, generally associated with calcite. This dark-grey oxide is very seldom pure oxide, but contains a variable percentage of sulphide of copper, and it is from the decomposition of this ore that it has most probably arisen. The outcrop extends for about six chains in length, showing a strike of N.  $35^{\circ}$  E., and apparently dipping steeply to the S.E. Its thickness is about 15ft. The second outcrop of copper ore lies about one and a half chains eastward of the first, to which it shows great resemblance in mineral character. It is only from 1ft. to 2ft. thick, and is traceable on the surface for about one chain in length. The country between the two ore outcrops, and for some distance both east and west, consists of argillaceous friable mudslates, which show between the outcrops a strike of N.  $23^{\circ}$  E., and dip easterly at a very flat angle; further east this strike is E.  $35^{\circ}$  N., with a south-easterly dip of  $40^{\circ}$ . West of the large quartz reef, more especially on top of the hill, the slates are traversed by quartz and ironstone or gossan reefs, in great abundance, and large blocks of brecciated brown iron ore appear scattered over the surface. (Ulrich, 1872.)

**CONSTITUTION HILL COPPER MINE WEST** lies about one and a half miles west of the hill. The ore indications occur in a lode of hard yellowish and reddish white flinty limestone, and consist of thin veins and coatings of malachite and scattered specks of greyish oxide of copper. The lode is from 3ft. to 4ft. thick, and strikes W. 20° N., with dip apparently steep to the northwards. The country which the lode traverses consists of fissile purple slates, showing false bedding, and striking nearly due east and west, with a northward dip of about 60°. These are succeeded, at six chains southward, by grey calcareous slates. (Ulrich, 1872.)

**COPFERER MINE** is situated about six miles inland from Tumby Bay, on the western shore of Spencer's Gulf. There is no record of the work done. (1859.)

**COPPER HILL (KULPARA MINE.)**—This was another of the large group of adventures in the district of Yorke Peninsula entered upon as one of the results of the success of Moonta and Wallaroo mines. A lode was discovered in a very favorable channel of ground by a shepherd. There was a good show of green carbonates, and a large lode was opened upon, but it is related that the company came to grief through mismanagement. Instead of following down the lode, a vertical shaft was sunk which cut through the footwall, and the lode was lost. A large amount of money was spent, and then operations were suspended.

**COPPER KING.**—This was a discovery, contemporaneous with and adjacent to the preceding. The lode formation consisted mainly of manganese, with which was associated a quantity of green carbonate of copper.

**COPPER VALLEY** (subsequently known as the Kooroona).—This was a venture undertaken on the borders of the Hamley Mine, with a view to discover the continuation of what was known as Bower's lode in the Moonta Mines, which had proved very productive. At a depth of 3 fathoms from the surface a lode was opened upon, which was deemed well worth the outlay of capital, all the conditions being favorable; but, on the collapse of the copper market in the "seventies," work was discontinued.

**CORNELIUS CLAIMS.**—Situation ten miles south of Benowrie station on the Outalpa sheep run. On the 80-acre block leased on a ridge traces of copper can be seen for a considerable distance, and in the bedding of the strata there are (says the Inspector of Mines) bunches of copper. Parcels of ore yielding 18 per cent. of metallic copper have been sent away, but the general average of the ore is of lower grade, it being intermixed with iron oxide and silica. The enclosing rocks are granite and clay slate, whilst beds of black micaceous gneiss are prevalent. Colors of gold were observable in the copper ore, and the quantity of gold might increase if the copper deposits become more siliceous in depth.

**CORNWALL** (afterwards called the New Cornwall).—This is a mining property near to Kadina which was believed to carry a continuation of two lodes that had been worked in the Wandilta mine, near to the Wallaroo mines. As usual in discoveries in that locality, there was a show of green carbonates mixed with the nodular and loose gravelly limestone, and the adventurers were rewarded by lighting upon a fine deposit of grey ore and green carbonate of copper not far from the surface, and a large and beautiful specimen was sent for public exhibition. The adventurers went to great expense, importing a large engine direct from Cornwall, and sinking to a considerable depth for prospecting at that period and that locality. Operations ceased after a while, and nothing in the way of practical working has been attempted on the property now for some years.

**CRINNIS COPPER MINE** is in the Angaston district. The lode is of an exceedingly interesting character. In the heaps of "spoil" that have been thrown out there were found specimens of native copper, blue and green carbonates, red oxides,



sulphurets, and copper pyrites, also micaceous and magnetic iron ore, carbonate of iron, chalcedony, opal, and white crystalline limestone. The vein has an irregular N.E. and S.W. strike. (Selwyn, 1859.)

**CROCKER'S CLAIM.**—A valuable property adjoining the Mutooroo Mine. No particulars obtained.

**CUMBERLAND MINE** belonged to the Wallaroo group, on Yorke Peninsula. What appeared to be a fine lode of very rich grey ore was found on the surface, but proved to be a blow only, and ran out in about 3 fathoms. Some fine galena was also met with in a similar way. Three shafts were sunk—one to the depth of 27 fathoms, and many fathoms of drives and costeneing were cut, but the lode could not be found, and the mine was abandoned. (Austin, 1863.)

**CUNLIFFE COPPER SYNDICATE.**—A Yorke Peninsula prospecting venture; operations discontinued.

**CURRAMULKA MINE**, in the hundred of Curramulka, Yorke Peninsula, fifty-six miles west of Adelaide. There are traces for some distance of copper ore in calc-spar, in the blue crystalline limestone, but there is no appearance of a lode, and nothing to warrant the sinking of a shaft (1864), although it is probable that there is a lode deposit somewhere near to account for the presence of such specimens as were obtained.

**CURRENCY CREEK SPECIAL SURVEY.**—A copper lode intersected the township lands, and specimens of blue and green carbonate brought from there to Adelaide created much attention at the time. (1848.)

**CURRENCY CREEK COPPER MINING SYNDICATE.**—Locality, about four miles from Goolwa, adjoining the Great Bradford. Two lodes, strike north-east, width 2ft. and 3ft. 6in., have been sunk upon 10 fathoms, following dip of lode, and a drive has been put in 140ft. The ore is a red oxide; highest assay, 37 per cent. for metallic copper. Operations suspended for want of funds.

**DAISY COPPER MINE**, near the Yudnamutana mines, contains two lodes, one of which is about 4ft. wide, and traceable for 80 yards along the surface, carrying grey and red oxide and green carbonate in fine gossan. (Austin, 1863.)

**DALY COPPER MINE** lies about five and a half miles E.N.E. of the Yudnamutana mines, and the country to the south and westward is, if anything, more broken, rocky, and wildly romantic than that in the neighborhood of the Yudnamutana. The workings, such as they are, are opened in a very strong mass of quartzite that runs at a strike of about N. 45° W. up the steep slope and along the top of a range which rises to a height of about 200ft. above a creek lying to the S.W. The ore is of a very good percentage, and consists of earthy, and sometimes crystallised, malachite and azurite, interspersed with patches and seams of red and grey oxides of copper. The quartzite is generally much fractured, rather brittle, and full of argillaceous veins, only in some places, where the latter disappear, it is very hard and tough, and traversed by veins of quartz, often finely crystallised and enclosing scales of micaceous iron ore. It extends, with two short breaks occupied by earthy conglomeratic shales, for about 25 chains in length, and shows abundant copper stains nearly all the way. The rocks of the district are of metamorphic character, presenting mica schist, hornblende schist, satiny and spotted slates, all of the same varieties as observed near the Yudnamutana mine. (Ulrich, 1872.)

**DAVISON'S CLAIM** lies about two and a half miles from the Blinman mine. It contains good indications, reaching from the gully to some distance up the hill. A

lode of ore of fair quality was discovered by sinking a shallow pit at the bottom of the hill, and in two or three other places ore was found. (Austin, 1863.)

**DEPÔT CREEK COPPER MINE** is situated about twelve miles from Mount Rose and near Eyre's depôt. The general character of the lodes here is favorable to the production of copper ores of good quality. The lodes contain green carbonate of copper, grey ores, and red oxide. (1860-9.)

**DERREINGTON.**—This prospect was worked on a section a short distance from Moonta Mines, and secured favorable results, but funds failed. The claim lapsed in the year 1873.

**DEVON CONSOLS (NEW DEVON, or GURNER'S).**—Shortly after the Wallaroo Mine had commenced working, a discovery in its vicinity, said to have been made whilst excavating for a water tank, was named the Devon Consols. A small syndicate took out a lease and did some work, getting a little good ore near to the surface, but afterwards forfeited their claim. Then a company was formed, ultimately having a nominal capital of £28,000. All the available part of that capital became exhausted, and the affair was wound up, not for want of productive lodes and a good prospect, but for want of funds. It is stated that there are five proved lodes in the Devon Consols lease, running about east and west. The country is a micaceous schist, decomposed as it approaches the lodes. At the time of stopping work, prior to the last change of proprietorship, there was at the bottom of one of the shafts a 6ft. wide lode of killas and ore, of which width 18in. was composed of yellow sulphurets. About 1,300 fathoms of levels were driven by the former proprietors, who had set up a 60 h.p. winding and pumping engine, with crusher and jigger, and separate steam power for working the machinery. After spending about £50,000 in developing the property, and getting everything into thorough working order, the mine operations ceased.

**DOLPHIN.**—Adjoins the Wallaroo mines on the west, and is regarded as a good property, though all the costeeing done to cut the Wallaroo lodes resulted unsuccessfully. Operations ceased when the small subscribed capital was exhausted.

**DOORA.**—This little mine, situated a short distance south-west from the Wallaroo property and adjoining the Kurilla, on the private property of Sir W. W. Hughes, was discovered through small pieces of carbonates being thrown up by burrowing rats. There has been a great deal of copper ore taken out, and the lodes are reputedly large, but the ore is of low percentage.

**DUCER'S SLIDING ROCK.**—Two mineral claims adjoining the old Sliding Rock mine. No further information.

**DUKE OF CORNWALL.**—Situated about six miles from Kadina on the Adelaide-road and adjoining the Truro. Four prospectors joined fortunes, costeeing on a gossany iron outcrop, to endeavor to cut the Cornwall lodes. The venture was unsuccessful.

**DURYEA COPPER MINE** lies about one mile south of the Wallaroo mines. It contained a great deal of ore, requiring treatment by some cheap process for preparing it for market. At the 12, 22, and 32 fathoms crosscuts and levels were driven, and two regular lodes, heavily charged with mundic, were found running nearly east and west, and underlying nearly 18in. in the fathom. In the 32-fathom level a good course of rich yellow and black ore existed, and here the two lodes seem to have run together. There is a good deal of black ore in veins throughout the mine, and some small branches of sulphide ore; but in several places patches of unproductive ground occur. (Austin, 1863.) More extended workings proved this mine to be unremunerative.

**DUTTON'S MINE**, eighty-two miles north of Adelaide, adjoins the Princess Royal mine on the south. No work has been done since 1851.

**EARL DALHOUSIE (Jerry's Mine)**.—Situated south-east of Copper Hill, and worked by Messrs. Levi & Watts, at the outset, on the strength of a discovery of green stains in stones, by a shepherd in their employ. Two shafts and a number of costeneing pits, proved to the proprietors that there was no payable lode.

**EAST MOONTA**.—A prospecting venture, which was intended to open on known lodes in the locality; but operations were not continued owing to the difficulty of providing capital.

**EASTHER'S CLAIM**.—This is situated in the hundred of Cudlamudla, and at one time prospects were said to be so encouraging that a syndicate called it the Northern Monarch, and commenced operations. Four shafts were sunk, and drives were put in, but failed to disclose any courses of ore that would pay to work. The Inspector of Mines' report was that the picked ore bagged on the surface was worth only about 15 per cent., and, considering the smallness of the quantity obtainable and the lowness of the grade, there was scarcely an inducement to proceed with expenditure. Copper can be traced for a long distance on the surface on a north and south course.

**ELATINA MINE**.—South-west of Mount Emily. No records obtainable.

**EMU MINE**.—This was, it is stated, one of the original Wallaroo mines sections, and was leased under the impression that the land contained the point of juncture of the Wallaroo and New Cornwall lodes. After a brief and discouraging test of the property, the adventure was wound up, and the lease forfeited.

**EMU CREEK COPPER MINE**.—The report of the Inspector of Mines in October, 1889, states that this claim is situated ten miles north of Beltana railway station, in a country composed of gray arenaceous banded slates and clay slate. The hill is traversed by a lode of magnetite and brown oxide of iron, and on the west there is an outcrop of limestone covering the cap of the lode. On this being disturbed carbonates can be found. The size of the lode is undetermined, the work done being on the footwall. Two veins exposed vary greatly in width. A shaft has been sunk 106ft. on a good branch of carbonates, and at 30ft. a workable branch was followed in a drive for 25ft., and 12 tons of 30 per cent. ore was raised and sent away. Below the 30ft. level the veins pinched, and the shaft was continued on the underlay; but the branches appeared to get further apart. Another shaft was sunk on irregular branches of ore. The mine is worthy of being further tested.

**EMU FLAT COPPER MINE** is south-west of the township of Clare; here the vein is a mixture of quartz, carbonate of lime, and sulphate of baryta, in grey, white, and brown slate, and hard white calcareous and siliceous rock, and the ore, impure green and blue carbonates, mixed with sulphurets of copper and iron. Not much work has been done on it. (Selwyn, 1859.)

**ENTERPRISE**.—This mining company held various sections on lease and freehold, amongst others section 5535, on the Sixth Creek; section 5607, on the Torrens; and section 267, adjoining Wheal Gawler Silver-lead Mine. On the Sixth Creek section, ores were found comprising red oxide containing specks of virgin copper, grey copper, black oxide, and occasionally traces of blue and green carbonate. The company began operations in the spring of 1847.

**ENTERPRISE COPPER MINE**.—Locality, eleven miles from Gawler, near Williams-town; 160 acres held on lease.

**EUCHRE PACK.**—Seven mineral claims, each eighty acres, situated fourteen miles from Hergott, and adjoining the Callana. No records.

**EUKO.**—This mine owed its discovery to burrowing rodents, just in the same manner as that heralding the Doora find. Costeening, the prospectors found the back of a lode, which was found to be parallel to the lode in the North Yelta and south of it. A shaft was sunk 22 fathoms on the lode, but a crosscourse at the 14-fathom level interfered, and the lode has never been discovered north of it.

**FIFTH CREEK CENTRAL.**—Situation of mine, about eight and a half miles from Adelaide, hundred of Onkaparinga. The company has acquired 147 acres by purchase, and, at the date of the Inspector of Mines' visit, had spent about £600 in mining operations. Ore sent to the Port Adelaide Smelting Works realised  $11\frac{1}{2}$  per cent. fine copper, and 45ozs. of silver per ton. The samples taken by the Inspector for trial by the Government Assayer gave, per ton—No. 1,  $5\frac{1}{2}$  per cent. of copper and 85ozs. of silver; No. 2,  $3\frac{3}{4}$  per cent. copper and 6ozs. 11dwts. of silver; and No. 3,  $4\frac{1}{2}$  per cent. of copper and 28ozs. 15dwts. of silver; average, 5 per cent. copper, and 40ozs. silver. The ore can be dressed to 30 per cent. copper containing 240ozs. of silver to the ton. The constituents of the lode are gossan, oxide of iron, with blue and green carbonates of copper. So far the ore has been found in very limited quantities, but development would probably lead to the discovery of larger bodies; and there are excellent prospects of ultimate success. (See also under "SILVER.")

**FLAXMAN'S VALLEY MINE**, thirty-eight miles N.E. of Adelaide. Information unobtainable.

**FLINDERS MINE.**—One of the Burra mines, worked by a Melbourne company. No records.

**FLINDERS COPPER MINE** is two miles north of Tumby Bay, Spencer's Gulf. No record of workings extant.

**FROME COPPER MINING SYNDICATE.**—Three mineral leases, situate three miles south of Allioota, on the Angipena sheep run, near Beltana.

**GAMMON CREEK MINE.**—The lode is a well-defined one, showing on the surface for about 3 chains in length for an average width of 4ft. Specimens sent to Adelaide contained grey sulphides. (1860-9.)

**GLENALBYN MINING COMPANY**, established 1850, to work four sections, situated about one mile to the N.W. of the township of Strathalbyn. Stopped in 1851, on the exodus of miners to Victoria. No records obtainable.

**GORGE COPPER MINE**, two miles south of Normanville, is on the face of a steep hill rising almost abruptly from a flat half a mile from the sea. The lode runs N.N.E., and is traceable for above 250 yards. On the surface it is composed of a quartzose rock strongly stained and impregnated with blue and green carbonate of copper, and contains thin veins of ore. (Austin, 1863.)

**GRAND JUNCTION MINE**, forty-five miles N.E. of Adelaide. No information procurable. (1867.)

**GREAT BENOWRIE.**—Two mineral claims, 11,172 and 14,327, containing about sixty acres, situate sixteen miles from the Mingary railway station. No information obtainable.

**GREAT BRADFORD MINE**, four and a half miles from Finnis Flat, county of Hindmarsh, has been abandoned for many years. No records.

**GREAT BRITAIN.**—This is situated on the seashore at Port Wallaroo. A shaft was sunk just above high-watermark, and a strong lode found. In rough weather the high tides did damage to the workings, and the directors were unable to make provision against this difficulty. The mine is full of water, and has remained so now for some years.

**GREAT CONSOLS.**—This was a costeneing venture, undertaken by a few prospectors, on a section on the road between Moonta and Penang. Very little was done in the way of exploration ere it was abandoned.

**GREAT GLADSTONE COPPER MINE** is situated thirty-two miles easterly from Port Augusta, on the slopes of low hills lying to the eastward of Mount Brown. The country consists of clayslate and quartz. There are several outcroppings of ore, and the backs of the lodes consist chiefly of ironstone, but there are fine specimens of rich copper ore, grey oxide and brown ore, besides green carbonates and a little malachite. Small particles of galena were also met with. Three shafts were sunk, varying from 8 to 17 fathoms in depth, and drives were put in for some distance. This mine is rich in specimens for the cabinet, the crystals of quartz stained with copper and other metals being very beautiful. (Austin, 1863.)

**GREAT KIRWAN MINE.**—Eight mineral claims, each eighty acres, situate about twelve miles south-east of Hawker. (See KIRWAN.)

**GREAT WHEAL ORFORD MINE**, better known as the "Old Reedy Creek Mine," was comprised in the property of the Australian Mining Company at Tungkillo. There were several lodes, and extensive work has been done on one or two of them. One shaft was sunk to a depth of from 40 to 50 fathoms, and an adit was driven to a distance of 300 fathoms. The 10, 20, and 30 fathom levels were also driven to considerable distances. The lodes were from 2ft. to 8ft. wide, and contained green carbonates and grey ore. (See under "GOLD.")

**GREEN AND GOLD MINE.**—This mine is situated about ten miles E.N.E. of Olary railway station, and possesses a large lode formation of siliceous iron ore, containing a lode of copper pyrites and carbonate of copper about a foot wide. The walls consist of micaceous schist and micaceous granite with garnets. The lode strikes E.N.E., and an excavation made showed an increase in thickness. The rock formations are metamorphic granite, gneiss, and mica schist, with dykes of eruptive granite. (See also "GOLD").

**GREENOCK CREEK MINE**, distant thirty-four miles from Adelaide. Indications were considered good, but work was suspended in 1851.

**GREGOR'S MINE.**—Situation, three miles above the Gorge and near the Parachilna Creek. Prospecting for copper has been carried on for a good many years, and a small quantity of ore is said to have been sent away. The veinstones are ferro-calcite and quartz. The country is much broken up, and is precipitous, but indications warrant greater effort in prospecting.

**GRUNTHAL COPPER MINE.**—(See under "GOLD.")

**GUM WELL**, about fifty-six miles east of Petersburg. Two miles west of Gum Well station there is an old mine. The workings are an open cutting, 30 yards in length and 10ft. deep, and a shaft about 40ft. deep. In the cutting a quartz and ironstone reef is disclosed, carrying copper ore. The strike of the reef is E.N.E. The rocks are black and bluish calcareous slates, and fine-grained slaty sandstone and limestone. (1885.)

**HALLET'S MINE**, within two miles of Reynella, has not been worked for many years past. No records obtainable. (1867.)

**HAMLEY MINE** (the old Karkarilla) belongs to the Moonta group on Yorke Peninsula. In the first instance (1861) there was a small company subscribing twenty shares, and they took up seven sections west of Moonta mines. Afterwards the present property was secured. In March, 1862, ore was cut where the engine shaft now stands, and a second shaft was sunk. Carbonates and black and yellow ore were discovered at 17 fathoms, and then nothing of value until the depth of 40 fathoms was reached. The mine shortly after stopped work, but very soon a reconstruction under the present name led to a renewal of operations with successful results. There are six lodes running in a westerly direction, and underlying 3 ft. per fathom, and bearing  $12^{\circ}$  E. of N. Their average width is 3 ft., and the ores they contain are chiefly yellow and purple. The veinstone associated with the metallic minerals is quartz and feldspar, and the country rock is hard and close. The quantity of ore raised (February, 1887) equalled 41,814 tons of the value of £333,739, and the average percentage of copper was 20 per cent. Nine shafts have been sunk, the deepest of which is 153 fathoms. The ore occurs in a regular defined lode with occasional bunches. (1887.)

**HAMLEY EXTENDED**.—Locality, near Moonta. No information available.

**HART'S MINE**.—Situated south of Ardrossan, Yorke Peninsula. No information available.

**HOME MINE**, or strictly speaking the Home Shaft, is one of many shafts in the Wallaroo mines, Yorke Peninsula. It is a short distance north-west of the Matta Matta mine, and near to the town of Kadina. Other shafts in the immediate neighborhood, are the Wombat, Taylor's, Young's, and Hughes'. These are sunk upon the same lode, running east and west, at considerable intervals apart. Mr. Austin wrote in 1863 :—

In Hughes' shaft, at the 40-fathom level, a drive has been carried east on a splendid course of solid ore, 8 ft. in width. The prevailing nature of the ore in this mine is yellow sulphuret, but a variety of ore has been met with in the course of the workings, namely, red and grey oxides, carbonates and muricates, and a little malleable copper. The average quality from these mines does not exceed probably 15 per cent., but the quantity is enormous.

**HORSESHOE, ONKAPARINGA**.—No records available.

**JOHN BULL MINE** (or Cocking's Warioota) is close to the original Warioota mine, which is situated about ten miles S.W. of the township of Beltana. The original finders, four miners, worked on these claims for twelve months, without the aid of machinery. The lode, as it appeared on the surface, was almost flat. About 50 tons of ore were tried, and gave nearly 45 per cent. without dressing. (1860-9.)

**KADINA MINE**.—This was a speculative venture in the neighborhood of the town of that name, but no satisfactory results were secured.

**KALKABURY MINE**.—No information preserved.

**KANMANTOO MINE**, thirty-three miles S.E. of Adelaide, is the property of the South Australian Company, and was worked by them from 1846 to 1852, raising 3,410 tons of fair ore. It was found, however, that the expenses were greater than the profits, and work ceased. Since then mining has been done by small local companies at different times, but in no case at a profit. The mine has now lain idle for some years past. Mr. J. B. Austin wrote of this mine in 1863 as follows :—

The principal lodes are the Kangaroo, Emily's, and the Boundary lode. The two first run north

and south, and the latter is a counter lode. The first lode yielded yellow ore of a moderate percentage. Emily's lode gave large quantities of yellow ore, which at the 10-fathom level gave place to red oxide and native copper. Two levels have been driven on the lode at 16 and 26 fathoms respectively. The copper produced at the smelting works from the ore now being raised amounts to about twelve tons per month. A great amount of work has been done at this mine since its commencement. The South Australian Company raised about 4,000 tons of ore, and opened a large extent of ground. Mr. W. B. Dawes, the subsequent lessee, raised about 1,900 tons. Smelting works were built in the neighborhood of Scott's Creek, and consisted of a calcining, a reverberatory, and a refining furnace, and other necessary buildings.

The Inspector of Mines, reporting recently on the Kanmantoo, says the shafts have caved in by reason of non-working, but that the large open quarries bear evidence of the size of the bunches of carbonate ore worked. The series of lodes and crosscourses make lenticular bunches of ore on a lode bearing north and south. About 15,000 tons of ore have been got by occasional working during a period of over thirty years. The water proceeding from one of the crosscuts holds sufficient copper in solution to yield precipitates of high grade, which would supply a regular income for opening up the mine, which is not yet explored beyond the 30-fathom level. (1889.)

KANMANTOO MINE WEST is on an adjoining section to the last, but no great amount of work was done upon it, nor have any special results been recorded. Some good carbonates were obtained in one part of the mine. (Austin, 1863.) The Inspector of Mines says this property has the Paringa lodes, and is worthy of further test. With sufficient capital to provide dressing machinery and open up the mine, payable returns might be expected. A 6in. lift would keep the mine dry, and low-grade ore might be made to give returns, because of the nearness of the railway. (1889.)

KANNAPPA MINE lies thirty-seven miles E.N.E. of Adelaide. A lode was cut in the 20-fathom level, and seemed to be of a very good character. No further records obtainable. (1867.)

KANYAKA MINE is fifty-seven miles, in a N.N.E. direction, from Port Augusta. In a country consisting chiefly of pipeclay, decomposed slate, and soft sandstone, there is a very well defined lode, having near the surface the appearance of indurated clay, strongly stained with copper, and containing occasional stones of ore of fair average percentage. The lode is from 2ft. to 30in. in width, but is rather flat, dipping from the horizon only about 2ft. in the fathom. A great deal of gypsum is found at the sides of the lode. Several shafts have been sunk, the deepest of which is 15 fathoms, and these are connected by drives extending for about 40 fathoms. (Austin, 1863.)

KAPUNDA MINE is the oldest copper mine in South Australia, having been discovered in 1842, by Mr. Francis S. Dutton and Mr. Charles Samuel Bagot. The workings are on hilly ground of moderate elevation. The first ore was raised at the Kapunda mine on January 8th, 1844; and on the 23rd of the same month, five dray loads were dispatched to Adelaide. The news of the discovery of this new source of wealth to the colony caused great excitement in the city, and had the effect of stimulating the search for minerals in all directions. In the Kapunda mine there are four lodes, of widths varying from 4ft. to 6in. Main lode is the chief one, and is intersected by Cox's lode at an angle of 25°; Hart's lode crossed both Main's and Cox's, and it was here that the richest deposits of ore were discovered. The direction of the lodes is 25° east of north, and the underlay as a rule is 2ft. in the fathom. Associated with the metallic minerals is a run of blue decomposed slate on the east and north, red soapstone on the west, and on the N.W. a hard dark rock which dips toward the south, and though seen on the surface is not again met with until a depth of 75 fathoms is reached. The proportion of metal to the ton is about 18½ per cent. There are eight shafts, comprising two of 75 fathoms, one of 35 fathoms, and five ranging from 14 to 25 fathoms. The water level is 8 fathoms below the surface. On the 14th June, 1879,

the mine was sold under liquidation, and from that date to within the last few months (May, 1886) has been worked by tributors. The ore raised by them is valued at about £9,000. Unfortunately, information regarding the total quantity of ore raised has not been available, but in Harcus' "South Australia," 1876, an article from the pen of Mr. J. B. Austin gives the quantity raised from the time of the opening of the mine until it was sold as averaging 2,000 tons per year. At the 75-fathom level an exceedingly rich lode of from 2ft. to 3ft. in width was found, consisting of yellow sulphide of copper, said to be equal to 24 per cent. Mr. Alfred R. C. Selwyn, Government Geologist of Victoria, who visited the Kapunda mines in 1859, remarks:

The mines are worked in a very peculiar soft aluminous rock of various colors—from pure white passing into pink and red, grey and blue. Frequently it is either covered with spots or traversed at right angles to the beds by thin veins or streaks of a pure white soft mineral, probably silicate of alumina. The galleries are all driven with pickaxe and spade, the rock seldom being hard enough to render the use of powder necessary. The general dip of the beds near Kapunda is west 10° to 20° south. The veins, of which there are several running in parallel lines, north by east, and south by west, have also a westerly underlay from 25° to 80°. To the N.E. they all terminated abruptly in a soft dark-blue pyritous slate, which runs N.E. and S.W., dipping to the N.W., from 26° to 70°. On their southern strike the veins are all intersected by a series of nearly east and west faults, throwing them to the eastward in steps. The ores, blue and green carbonates, and red and black oxides, and native copper, seem to occur in very irregular veins and patches occasionally in the planes of the bedding.

#### KARKABILLA MINE.—(See HAMLEY.)

KARKULTO MINE is situated between Kapunda and the Burra, and is about thirty-five miles from the first-named township. This mine is chiefly remarkable from the fact that, though the indications of copper were considered extremely good, very little copper was obtained. Large and regular lodes were found, the walls were well defined, but the ironstone and gossan in them did not, as was hoped, give place to copper. (Austin, 1863.)

KELLY'S MINE.—Situated 2½ miles north-west of Blinman Mine, on a mineral licence over eighty acres. There is a lode striking east and west, 2½ft. wide, on which an underlie shaft has been sunk 30ft., and a drive 6ft. west has been put in. The walls are composed of soft siliceous limestone, and the lode gives about 2½ tons of carbonate ore per fathom. Facilities for transit and smelting would lead to great development of this and other similarly situated mines. (Captain Doble, 1890.)

KETCHOWLA, Pandappa Dam, N.E. District.—There was a show of copper on the surface at this place, and a fair amount of work was done to prove the lode; but, as the prospects were not promising, the mine was abandoned. Galena is said to be found in the neighborhood.

KINGSTON MINE, seven miles north-east of Koorunga.—Some stones of ore, oxide of copper, and silver-lead have been found on the property. No further record obtainable. (1867.)

KINTORE MINE.—This mine is situated seven miles south-east of Yunta Railway-station. A vertical shaft was sunk, which cut a vein at 40ft. depth, which has been followed on the underlay at an angle of 20°, and shows specular iron, oxide, and carbonate of copper, intermixed with quartz, but the Inspector of Mines was of opinion that this discovery was not worth following up. (1889.)

KIRWAN MINE lies four miles south of Mount Craig, seventy-two miles N.E. of Port Augusta, and about twelve miles from Hawker, at the foot of a range of hills sloping towards a plain to the westward. The country consists of a light soft killas and a kind of pipeclay. There are several lodes and bunches of ore on the property, running generally to the east of north, and underlying from 18in. to 2ft. in the fathom. Three shafts have been sunk, and at the bottom of the deepest, 21 fathoms, there is



a lode between 3ft. and 4ft. wide, composed of quartz and copper pyrites. In a cross-cut, driven to the S.E., a lode of fine blue and green carbonates, about a foot wide was cut. A short distance to the west two shafts were sunk on the course of the lode, which is composed of carbonates of copper intermixed with ironstone, and is traceable for 300 yards. On another section, about a mile and a half S.E. of the Kirwan, a small shaft was sunk on a lode running east and west, and which produced some fine grey and red oxide. The country on the Kirwan Mine differs somewhat from that on either side, and would seem to be a band of more favorable strata for copper. (Austin, 1863.) Recently the property was examined by the Mining Inspector, who states that the claim has been worked for copper twice, and was started over twenty years ago. The ground is favorable, and there are several outcrops. There is a large north and south lode, composed of iron, quartz, and manganese, and a strong pyritous lode running north-east and south-west. A tunnel driven into the hill disclosed six veins of copper of excellent grade. It is a fair prospect and worthy of being tested in depth. Several tons of ore, yielding 30 per cent. of copper, are stated to have been raised at this mine. (1889.)

**KOAJEUNE MINE.**—Situated three miles east of Port Wallaroo. Two or three shafts were sunk, and some good copper ore was taken out. Capital was unobtainable and the mine was abandoned.

**KOH-I-NOOR MINE.**—Situated one and a half miles N.E. of the Paramatta mine, near to the Challa. A shaft was sunk about 10 fathoms, and small specks of yellow ore found in good ground, but results were disappointing.

**KOORONA MINE.**—(See COPPER VALLEY.)

**KOOAGNIE COPPER MINE.**—This was a discovery of carbonates of copper on private land four miles from Kadina, and costeeing led to the discovery of a lode formation. A shaft was sunk on the dip of the lode south, but the lode not proving productive of any large bodies of ore, a vertical shaft was put down 80ft., and crosscutting was carried on. The indications on the surface warrant, in the estimation of the Mining Inspector, a continuation of prospecting operations. (1889.)

**KULPARA MINE.**—(See COPPER HILL.)

**KURILLA MINE** lies a little to the S.W. of the Wallaroo mines. It contains three lodes underlaying north, with an east and west bearing, and having an underlay ranging from 1ft. 8in. to 2ft. 3in. in the fathom. The width of the lodes varies from 1ft. to 9ft., and the ore they contain is chiefly chalcoppyrite. Sometimes, indeed, it is pure chalcoppyrite, but, in other instances, it contains from 3 to 15 per cent. of copper. The veinstone associated with the metallic minerals is iron pyrites, portions of the bedrock, &c., while the country rock is talcose schist. Twenty-six shafts, including the trial shafts, have been sunk, the deepest of which is 498ft. The length of drives put in at various levels in 1886 equalled three and one-sixth miles. The water level was reached at 30ft. The deposits of copper ore are chiefly along the lead of the lodes, associated with "gangue," the present supplies being mostly chalcoppyrite. In many ways this mine is similar to the Wallaroo mines, the chief difference being that the veinstone is not so mixed with "gangue," so that the chalcoppyrite is of a higher percentage. Accurate information with regard to the total amount of ore raised, and its money value, has not been obtainable. But, during the ten years from 1874 to 1884, the ore sold from this mine equalled 19,397 tons, of the value of £155,068. Of the ore raised prior to 1874, no record has been kept; and, of that obtained since 1884, it is probable that at least 1,000 tons have been sold to the value of £5,000. (1886.)

**LAKE TORRENS MINE** is adjacent to the Beltana Mine, on the Western Plains. It was originally taken out by resident squatters, and held by them for several years.

The lode is said to show on the surface for a distance of 600 yards, and its back is alleged to be 6ft. wide in some places, consisting of good copper ore. (1860-9.)

**LEATHER AND CHIPS MINE.**—This mine was situated near Wallaroo mines, and not far from and south of the Doora. It was one of a series of speculative ventures. It was never worked.

**LEIGH'S CREEK MINE.**—Four miles east of Mount Coffin. There are two, north and south, lodes. The lode is calcite, quartz, and gossan, with a dip 45° east, alternating with slate, dip west; strike E. 20° S. The ores are blue and green carbonates. Two shafts have been sunk to a depth of 80ft. to 100ft. Another mine is situated about two miles S.E. of Leigh's Creek railway station, from which some copper ore has been obtained. Green carbonate exists in small veins, coloring a white argillaceous sandstone. Associated with this are reefs of iron ore and siliceous rock. (Visited in 1884.)

**LINDO'S CLAIM.**—This is situated at Cudla Mudla, and not worth working, according to the Inspector of Mines' judgment. There is in very hard ground a small irregular vein of ferro-calcite, carrying carbonate of copper.

**LYNDON VALLEY.**—The Enterprise Mining Company held a twenty-one years' lease of two sections in this valley. No record of work done.

**MACDONNELL HILL CLAIMS.**—Situated on the Outalpa sheep run. The Inspector of Mines reported recently that very little work had been done, the deepest pit being 20ft. In the first pit there was visible a branch of very fair grade carbonate and oxide of copper, well worth sinking on, apparently a true lode, gradually increasing in size as depth is attained, with east and west bearing, and southern underlie. Like most of the copper ores in the north-east, a small quantity of gold is present, but not sufficient to pay for cost of extraction. The other costeenings on the ground show that a considerable extent of it is copper-bearing, and the claims are only two miles from a railway. There is sufficient inducement for further prospecting.

**MAGILL.**—A mine was opened near this place in 1846. No record of work done.

**MAITLAND COPPER MINE.**—Seven claims, 560 acres, about four miles north-east of Maitland, Yorke Peninsula. The secretary states that blue and green carbonates on the surface led to a shaft being sunk on the dip of the lode, which is 4ft. wide, yielding grey and yellow ore. The lode is said to be in a fissure in the granite.

**MALONE'S MINE** is about eight miles from Watt's Sugar Loaf, and eleven miles from the township of Kanyaka. A lode containing stains of copper was found on the surface, and on sinking some good ore was met with, containing gossan. (Austin, 1863.)

**MALLEE HUT CLAIM** is about sixteen miles south of the Blinman mine, and about six miles south-west of Mount Emily. A lode opened in a creek showed good walls, with killas and flucan and fine gossan in the lode, and a fair amount of green carbonate of copper and yellow ore. The lode is nearly perpendicular, and 18in. wide. A small shaft was sunk, but the mine was ultimately abandoned. (Austin, 1863.)

**MATTA MATTA MINE,** Wallaroo, Yorke Peninsula. Two shafts were sunk to depths of 20 fathoms, and a fine lode of ore, running about E.S.E. and N.W. was cut at the 10-fathom level. It contained green carbonate and grey sulphuret, with red oxide and a quantity of malleable copper. (Austin, 1863.) The mine was worked as a separate property for a short space of time subsequent to the beginning of the

mining industry on the Peninsula. The operations of the proprietors were, however, suspended, in consequence of the influx of water; and ultimately the mine was included in the property of the Wallaroo Company.

**MATTAPARA MINE.**—Situating near Moonta. It was opened about 1874, and was worked on a small scale for some time, but no record of results is available.

**McCONVILLE'S MINE** is about six miles south from Kanyaka, amongst low bald hills. There is a lode on the surface, running about 300 yards north and south, and about 18in. thick. The ore, which is mixed with gossan and feldspar, is not continuous, but occurs in patches. It is a rich sulphuret of a dark-greenish-grey colour. A shaft was sunk on the lode to the depth of about three and a half fathoms, and a drive was then carried for five fathoms, copper ore being found throughout. (Austin, 1863.)

**MENKOO MINING COMPANY.**—A lease from the Britannia Mining Company, Bremer; worked to a limited extent and stopped in 1851. No records obtainable.

**MID-MOONTA MINE** (also New Mid-Moonta).—Exploratory costeening was undertaken because of the direction of the Moonta lodes, and favorable indications of deposits of ore being discovered, two shafts were sunk, the one called Harvey's, and the other Morris's, 17 and 30 fathoms, respectively. In the latter, levels were driven on the course of lode at 24 fathoms, and a quantity of high-percentage ore was taken out, the lode at foot averaging 4ft. wide, with every sign of improvement. As a result of the low price of copper, strong influx of water, and insufficient appliances and capital, the affair came to a standstill. An attempt was made to revive it a couple of years ago, but resulted in liquidation before practical work was resumed.

**MILDALTIE SILVER AND COPPER MINE** is situated 260 miles N.E. of Adelaide, and twelve miles S.E. of the railway in the district of Mingary, in a slightly undulating, undisturbed belt of highly metalliferous country. The following particulars have been furnished by Mr. W. H. James, mining manager:—Mining operations were started by the company in January, and costeening across the line of the strata (schistose rock) revealed three well-defined lodes with a strike N.N.E. and S.S.W., traversing the company's three eighty-acre sections. In putting down a shaft in a strong, well-defined lode, 30ft. of sinking yielded ten tons of 30 per cent. ore. The minerals near the surface were malachite and azurite, embedded in gossan, the latter worth 16ozs. silver per ton. At present bottom black sulphide is being raised. The full width of lode is not determined, but trenching on its course has shown it to be continuous in length. The lode improves in quality and size in depth, and the company has fully a mile of lode to work upon. Assays given by Government Assayer of samples supplied to him, gave—(1) copper glance, 5ozs. silver and 58½ per cent. copper; (2) ironstone, 30½ per cent. copper; (3) azurite, 6ozs. silver, 19½ per cent. copper; (4) malachite, 21½ per cent. copper.

**MINBURRA MINE.**—This property lies west of Waukaringa, and a little work was done in the strong outcrops, but without result. No further records obtainable.

**MOCHATOONA MINE**, twenty-seven miles N.N.E. of the Blinman, was at one time considered to be a wonderful discovery. For some time men were employed there, but the mine was eventually abandoned. Worked from 1860 to 1869.

**MONSTER LODGE PROPERTY** is near the Wheal Ellen Mine, about three miles from the town of Strathalbyn. It consists of several mining sections, upon which a few miners worked for some months on tribute. (Austin, writing in 1863.)

**MONTACUTE MINE**, situated on the Mount Lofty Range, and about ten miles nearly N.E. from Adelaide, is one of the oldest in the colony, having been discovered in 1843-4. The mine is on a steep spur of the range, and extensive out-croppings of ore were visible on the surface. The ores found were chiefly yellow and peacock ores, averaging 18 per cent. Some native copper was also found. (Austin, 1863.) In 1848 the quantity of ore raised was about 1,500 tons; the quantity shipped about 1,000 tons, and the highest price realised in Swansea about £18 per ton. In 1846 the Customs returns give 503 tons of ore exported from this mine. Work was stopped by the discovery of the Victorian goldfields in 1851 withdrawing all the miners. (See under "GOLD.")

**MOOLOOLOO MINE**, twenty-eight miles N.N.E. of the Blinman. This discovery was tested by a company, but the ores were not sufficiently rich to pay expenses of cartage to smelting works, thirty miles distant. Reports mention that on the hill is a "boil" capped with iron and manganese, showing good ore in several places. Very little work done. Worked from 1860 to 1869.

**MOOLOOLOO MINE SOUTH**, of the same description as the Moolooloo Mine proper. Operations conducted 1860-9.

**MOONTA MINE** was discovered in the year 1861, and has proved to be one of the richest mines in the colony. It is situated on Yorke Peninsula, on the eastern shores of Spencer Gulf, and the property comprises 2,673 acres of land leased from the Crown. There are five main lodes on the property, and from each of these, various spurs and minor lodes branch out, and are connected with the main lode by occasional cross veins. Including these there are twenty-seven lodes. Their direction is north-westerly, and their underlay varies from 3ft. to 6ft. in the fathom. The main lode bears N. 20° E., and the others vary from that to N. 45° E. The width ranges from 6in. to 20ft., and the ore obtained from the main lodes in the present workings is chiefly chalcopryite and occasionally bornite. The bulk of the veinstone—chiefly quartz and at times portion of the bedrock—as raised ore and "gangue" gives from 2 to 5 per cent. of copper, but sometimes clean chalcopryite gives 20 to 30 per cent., and bornite from 30 to 50 per cent. The country rock is felsite porphyry, orthoclase porphyry, a special variety. The quantity of ore raised from the mine from the commencement to the 30th June, 1886, equalled in gross tons of 21cwt. 476,180 tons, and the average percentage of copper on net dry weight of dressed ore equalled 20 per cent., and the total value in the colony of this ore amounted to £4,579,097. Seventy-seven shafts have been sunk, including twenty-one trial shafts. The shafts are vertical for a short distance, then mostly follow the dip of the lode. The deepest shaft is 287 fathoms (1,722ft.), and the levels measure, approximately, twenty-nine and a half miles. The aggregate length for thoroughfares, including drives, winzes and shafts, is about forty-two miles. The water level was reached at about five fathoms. The deposits of copper ore are chiefly along the lead of the lodes associated with "gangue," the present supplies being mostly chalcopryite and occasionally bornite. An exceedingly small proportion of green carbonate ore was formerly found close to the surface; but a large proportion of the green ore was atacamite, and this was generally met with below the other. Sometimes red oxide was found with the atacamite. The yield varies from half a ton to eight tons per fathom. The peculiarity of this cupriferous district was disclosed by the removal of these ores and the sinking of the shafts—namely, that although the lodes continued regular, no further ore was met with, and, as a rule no stain of copper was seen until the depth of from five to ten fathoms was reached, when rich oxide and malleable copper deposits were struck, and after that black and grey sulphides. These deposits, however, were chiefly worked out in past times. Chalcopryite occurred at an average depth of about twenty fathoms, and this, with occasional deposits of bornite, has held down either in large or small proportions to the present deepest point of opera-

tions. This mine at one time employed upwards of 1,600 men and boys, and still keeps a very large number (1,138) at work. Copper ore raised during four months ending December 31st, 1889, 5,759 tons; assumed to be the average rate of output. This mine is amalgamated with the Wallaroo Mine.

**MOONTA CONSOLS.**—An attempt on the eastern side of the Moonta Mine to discover some of the lodes; a little costeening was done, but the adventurers were unsuccessful.

**MOOROO MINE** is a few miles to the west of Prism Hill, and about twenty-five miles north of Mount Chambers. The indication leading to the discovery of this mine was a hill stained with copper from top to bottom, but the only work done is the sinking of two shafts to the depth of six and eight fathoms respectively. About twenty tons of ore were raised, but the water coming in strongly, and no promising lode being found, operations were discontinued. (Austin, 1863.)

**MOOROWIE COPPER MINE.**—This is situated on the Arrowie sheep run, on the eastern flanks of the Flinders Range, about a hundred miles from the Hawker railway station. The Inspector of Mines, in September, 1889, reported: An outcrop, running north-east, with an underlie to the north-west, has been opened upon in several places, and small bunches of good copper ore are found distributed irregularly in a ferro-calcareous formation. A shaft has been sunk 100ft. on the lode, which varies from 3in. to 4ft. in thickness. The ore is of excellent quality, the company's assays have ranged up to 79 per cent., and the Government Assayer's return on samples tried reached as high as 64 per cent. Cartage to railway, £3 per ton.

**MORPHETT'S MINE.**—Fifty-one miles N.E. of Adelaide. No records obtainable. Date of working, about 1867.

**MORTLOCK'S MINE.**—Near the Burrawing, Tumby Bay. No information as to results obtained.

**MOUNT BOLD.**—East of Clarendon, Hundred of Noarlunga. The Inspector of Mines describes this mine as being on Crown lands, the area held being 160 acres. A shaft has been sunk 145ft. At 60ft. depth a fair lode was exposed with an east and west course and southern underlay. On the hanging wall there is a branch of fair-grade yellow and peacock copper ore, and the lode will yield about a ton per fathom of ore dressed up to 20 per cent. Assays for silver gave 22ozs. per ton. The surrounding country is clay slate. There is a large extent of copper-bearing ground, and there is plenty of water available for dressing machinery. Even at the present low price of copper, he is of opinion that the mine might be worked to pay expenses and leave a margin of profit.

**MOUNT BOURNE MINE.**—A small venture on Yorke Peninsula. No information obtainable.

**MOUNT BURR MINE** is fourteen miles north of Patsey's Springs, and fifty-six miles north of the Blinman. The rock of which the mount is composed, and mainly also the spur on which lies the mine, is a coarse quartz grit, silicified and concretionary in places. It therefore assumes an appearance similar to that of the cupriferous outcrop of the Ooraldana mine. Shallow shafts have been opened on the spur, and the ore, according to specimens lying about, consists of earthy-green carbonate, with some chloride, and occasionally blackish grey, and, more rarely, red oxide of copper, associated with more or less brown hematite. The main ore-bearing part of the mine lies close along the boundary of the quartz grit and calcareous slate. This slate is also ferruginous and concretionary in part, and strikes E. 35° N., and dips N. 35° W. at 40° to 50°. The principal workings consist of a tunnel about four chains in length, starting from a small gully. In this tunnel are exposed, interstratified with the slate beds, brown iron ore, richly and intimately impregnated with grey oxide and green

carbonate of copper. This lies in thin layers, the thickest of which is not more than 3in. The walls, which are rather soft, contain green carbonate, mixed with chloride of copper; they also show glistening crystalline particles and thin veins of selenite. Further in, where the tunnel takes a strong bend to the southward, is to be found on the face a large pocket of ochreous brown iron ore. (Ulrich, 1872.)

**MOUNT CHAMBERS MINE**, six miles south of the hill of that name, and thirty-two miles east of the Blinman. The surface of the ground is covered with boulders of primitive limestone. Several large blocks of malachite were found in a clear space, running north and south between the boulders, and green carbonate is scattered about. There is no regularly defined lode, but blocks of ore were found in three different parts of the section. The country is moderately hard pipeclay. Several shafts were sunk in search of a lode, but without success. (Austin, 1863.)

**MOUNT COFFIN MINE** lies forty-one miles N.N.W. of the Blinman, and about one mile S.E. of the Mount Coffin Trig., on the side of a steep hill. The lode runs almost east and west, and carries a small but rich quantity of ore composed of chalcocite, malachite, and atacamite in a much-jointed slate. The dip is S.  $10^{\circ}$  W.  $65^{\circ}$  to  $70^{\circ}$ . Two or three small shafts have been put down and an incline drive following down the shaft alongside the lode. The lode is traceable for about two miles on the surface, and the underlay is about 2ft. in 6ft. to the south. About 78 tons of ore have been raised, but it is very dredgy, and requires machinery to dress it. The mine stopped working in 1883.

**MOUNT CRAIG**.—Sixteen miles east of Wonoka. A great deal of work was done here, but no important results followed. (Austin, 1863.)

**MOUNT DECEPTION**.—Between Beltana and Wirtaweena mines six mineral sections were taken up for mining purposes. They yielded some fine specimens and nothing more. (Held between 1860-9.)

**MOUNT DESIRE**.—In the neighborhood of this hill, which is situated about thirteen miles S.E. of Mernmerna, on the Great Northern railway, two mineral claims were taken out. They were west of the mount, at distances of three and eight miles respectively. Very little work was done upon them, though the mineral indications were considered good. (Date of prospecting, 1860-9.)

**MOUNT ELKINGTON MINE**.—Six miles west of the Blinman three sections were taken out. Copper shows on two of these in a well-defined lode. There is no record of work done. (Held 1860-9.)

**MOUNT EMILY MINE** is eleven miles due south of the Blinman and five miles from the mount itself. It is near the top of a small conical hill. The work is represented by a small excavation opened in a calcareous, mullocky shale, which is permeated by green carbonate and chloride, and contains scattered specks and small seams of grey oxide of copper. There are also present irregular roundish lumps of crystalline limestone, which, on being broken, show copper coloration throughout. Resting on this deposit, and forming the top of the hill, is an impure limestone, which apparently dips at an angle of  $50^{\circ}$  or  $60^{\circ}$  northward. The cupriferous shale seems to form an interstratified layer between limestone deposits. A bold outcrop of quartz commences about ten chains N.E. from the excavation, striking N.  $20^{\circ}$  E., and dips nearly vertically. Copper stains and coatings show here and there; but the principal ore enclosed is galena in thickly-scattered specks, small patches, and occasionally in veins. Two other outcrops are close at hand, but neither of them show copper stains nor lead-ore impregnation. The country between these reefs consists of indurated calcareous shales and slates, with interstratified bands of hard limestone; the strike is nearly east and west, dip N. at  $50^{\circ}$  to  $60^{\circ}$ . These rocks, judging from fragments scattered on the surface, seem to be traversed in the vicinity

of the mine by small dykes of diorite greenstone; and about a mile southward, on the slope of a range, is a massive outcrop of the same rock. This should receive the attention of the prospector, for the reason that in Victoria dykes of this rock are traversed by auriferous quartz veins. Some of the richest mines in that colony are working on similar dykes. (Ulrich, 1872.)

**MOUNT EURO MINE** is situated amongst high and rugged hills, twenty-eight miles N.E. of the Blinman. A heavy reef of quartz and ironstone carries strong green and blue stains of copper, with occasional small pieces of ore; and in one place some good specimens of grey oxide were found. No work has been done on this section. (Austin, 1863.)

**MOUNT GRIFFITHS MINE.**—This venture adjoins the western boundary of the Fifth Creek Central, and a large amount of work has been done; but the Inspector of Mines is of opinion that there is no prospect worth following, although in one gully near a boundary a fair quantity of carbonate of copper has been opened up. Still the property is in a mineralized belt of country, and a drive to intersect the Central lode at 500ft. would fully prove it. (1889.)

**MOUNT GUNSON COPPER MINE** is situated about ninety miles N.W. of Port Augusta, and one mile west of Pernatty Lagoon. There are two lodes, bearing N.E. and S.W., and ranging from 6ft. to 18ft. in width. The ore consists of green and blue carbonates, and grey ore, containing about 26 per cent. of metal. The work done includes five shafts from 10ft. to 25ft. deep and surface prospecting, and about forty tons of ore, averaging 20 per cent. copper, have been raised, besides 200 tons low class ore suitable for concentrating. This mine has been worked by a small syndicate, but operations have been suspended because of the expense of cartage and scarcity of good water. The ore has been raised from an almost horizontal deposit, varying from 1ft. to 3ft. thick. Some of the ore by assay gave 18oz. silver. The veinstone associated with the metallic mineral is quartz, and the country rock is sandstone and slate. The mine was discovered about the year 1875.

**MOUNT GUNSON MINING SYNDICATE.**—Locality of property, Mona Lena sheep run, north-west of Port Augusta. No further information obtained.

**MOUNT HEMMING MINE**, ten miles S.E. of Beltana township, and sixteen miles N.W. of the Blinman. A shaft 38ft. deep was sunk, disclosing a good lode at bottom. (Period held, 1860-9.)

**MOUNT LOFTY COPPER MINING SYNDICATE.**—Locality, Mount Lofty; area, 80 acres. No records.

**MOUNT LIVERPOOL MINE** lies about twenty-six miles to the north of Port Lincoln. According to Mr. Austin, some good ore was raised from it at different times, but owing to the hardness of the ground work has been long discontinued.

**MOUNT LYNTHURST MINE** is situated twenty-three miles S.E. of Farina, and is represented by three small batches of workings on two low east and west ranges that closely adjoin. The stuff exposed in each of these workings consists of soft, shaly mullock, traversed by thin seams of quartz, thickly impregnated and coated with chloride and silicate of copper. Solid, small, nodular masses of these ores are rare, but in the two excavations near the top of the range there occurs a calcareous gossan which encloses occasional specks of grey oxide of copper. The second batch of workings lies in the same range, about ten chains further east, and consists of two shafts about 100ft. apart. The deepest of these is about 20ft., and the two are connected by a drive. The ore-deposits here are of the same character as those in the first batch. Judging from some specimens left near the shafts the ore has been of

pretty good quality. The third batch of workings is situated on the northern slope of the opposite low range, about ten chains southwards of the place just noticed. There are a number of shallow shafts, and one about 40ft. deep is sunk on what appears to be a regular gossan lode 1ft. or 2ft. thick. This is combined with a quartz reef which crosses the country at a strike of W.  $10^{\circ}$  N., dipping southerly at  $45^{\circ}$  to  $50^{\circ}$ , and which can be traced from this point further eastward for nine or ten chains along the slope of the range. The gossan contains veins and patches of very good ore, composed of dense grey oxide, intimately impregnated with chloride of copper. Portions consisting of a hard silicious brown iron ore enclose occasionally large and small particles of red oxide and specks of native copper. There are three parallel quartz reefs which occupy conjointly a width of 40ft. to 50ft., and extend for four or five chains in length at a strike nearly east and west, with apparently a steep southerly dip. The quartz is full of patches, and is traversed by veins of brown iron ore, but shows no copper indications. As regards the country traversed by the cupriferous gossan veins and quartz reefs, it consists of white and grey, much jointed, feldspathic-looking slates, alternating with slaty, more or less ferruginous sandstone. Mean strike E.  $5^{\circ}$  N.; dip N.  $5^{\circ}$  W., at  $33^{\circ}$  to  $35^{\circ}$ . Considering the character of the copper ore, and that it occurs in gossan veins, connected with well-defined quartz reefs, which are true lodes, the last-mentioned place presents encouraging prospects. Prospecting for gold in the alluvial drift of the gully, and on the surface of some of the slopes of the adjoining ranges, would be advisable, as the country does not look unlikely for this metal. (Ulrich, 1872.)

**MOUNT LYNDBURST MINE** No 2 lies about seven miles west of Mount Lyndhurst No. 1, on the top of a steep hill that rises about 120ft. above the adjacent gully. The copper ore occurs here in a number of closely-adjointing gossan and quartz veins, which vary in thickness from 1ft. to 8ft. These cross light, bluish, flaggy, more or less concretionary, arenaceous slates at a strike of N.  $45^{\circ}$  E., and dip N.W. at  $40^{\circ}$  to  $45^{\circ}$ . In the walls of these veins, and in the less regular hanging walls, there seem occasionally to occur pockets and irregular veins of brown iron ore and grey oxide, intimately impregnated with chloride and carbonate of copper. The ore, as seen in the heaps on the ground, is of rather poor quality, consisting of a breccia-like mixture of concretionary gossan and quartz, impregnated with chloride, carbonate, and grey oxide of copper. The country lying between these two mines (Mounts Lyndhurst, Nos. 1 and 2), and for several miles northwards, presents quite an auriferous aspect, and well deserves to be prospected for gold. (Ulrich, 1872.)

**MOUNT MARY COPPER MINE.**—Situation, Parachilna Pass. The Inspector of Mines states that there is a north-east and south-west copper lode on section No. 11,618, into which several openings have been made, and a branch of high-class ore exposed. No. 11,666 has been prospected by a shaft and shallow tunnel. On No. 11,619 a tunnel driven 90ft. into a hill has cut a big lode, coursing north-north-east. On this a shallow shaft has been sunk, several openings on the surface have revealed excellent prospects. An open cutting above these workings exposes a fine lode of copper of excellent grade. Hand picking can raise the average value of the ores to fully 35 per cent. Good supply of water and wood. The assays returned—(1), 41 per cent. of copper; (2), 38; (3),  $35\frac{1}{2}$  and 4dwt. 17gr. gold per ton; and (4), 36 per cent. and 4dwt. 12gr. of gold. (1889.)

**MOUNT NOR'-WEST**—A copper mine, E.N.E. of Kingston's well, has been worked by means of some shallow shafts, but the indications are slight. Green carbonate of copper occurs in the joints of a quartzite band, striking N.W. through calcareous and claystones. (1883.)

**MOUNT REMARKABLE MINE.**—Copper ore was found here about the year 1846-7. It was of fair quality, and some samples of it, together with a mineral supposed to be emery, were sent to England. The lode was small and "pinched," and the



ground very hard. Nothing worth the name of mining was done, and the claim was abandoned. The mine is 175 miles distant from Adelaide. (Austin, 1863.)

**MOUNT ROSE MINE** is about fifty-six miles N.N.E. of the Blinman. It is situated two miles north of Mount Rose, at the foot of a high spur. One main shaft and several smaller ones have been sunk to a depth of 10 to 13 fathoms. Apparently the copper ore occurs in two or three short pipe veins running close together or intersecting each other, and dipping, as a body, steeply westward or nearly vertical. The surface outcrops of these veins seem to have consisted of large masses of gossan, more or less thickly impregnated with malachite, and, occasionally, azurite. Of the ore occurring in depth, a lot left near the main shaft indicates it to be an irregular dense mixture of iron pyrites, copper pyrites, and impure copper glance, but the iron pyrites predominates. A soft micaceous slaty shale appears to form the veinstone in depth. The country in which the veins occur is composed of massive beds of yellowish grey arenaceous-banded slates and slaty sandstones, which alternate with thin bands of dense crystalline limestone and calcareous shale and sandstone. The strike and dip of these rocks is indistinct close to the mine, whilst, further off, great differences in strike and dip indicate a strong curve, or, perhaps, some disturbance in the beds. Considering the nature of the ore and the relation of the veins to the country, there is a good chance of the veins continuing in depth. There is, however, one cause for apprehension, namely, that the iron pyrites, which is already very abundant, might still more increase in depth, and thereby cause a serious deterioration in the quality of the ore. (Ulrich, 1872.)

Mr. E. F. Cooke, of the E. and A. Copper Company, kindly furnishes the following information from his recollection of the mine:—

No regular lode, I believe, was discovered, although large quantities of grey sulphurets and black oxides were raised, and sent down for smelting at Port Adelaide. This ore was of a very high percentage, the solid being sold at from 45 per cent. to 52 per cent., and the dredgy stuff averaging from 32 per cent. to 35 per cent. The ore was discovered in patches, interspersed throughout with what appeared to be sedimentary ground. Two shafts have been sunk, the deepest being 33 fathoms, and drives have been put out in all directions, extending about 25 fathoms in an east and west direction, and about 15 fathoms in a north and south direction. The greater part of the ground has been taken away to the 23-fathom level. In sinking between the 23 and 33 level some solid leaders of mundic were cut through, and in a drive from the bottom of the 33 two leaders of the same mineral with traces of black ore were found, and at the end of the drive what appeared to be a solid lode. On picking into this it let down such a quantity of water that the engine was unable to cope with the influx, and the mine was shortly afterwards abandoned. (1886.)

**MOUNT ROSE NORTH.**—This is a prospect on an adjoining section, exhibiting similar characteristics.

**MOUNT RUGGED, or PATAWARTIE.**—Nine miles N.N.E. of the Blinman. This claim contains several lodes, having backs of ironstone protruding above the surface, and showing green carbonate of copper, and yellow ore. In addition to good specimens of ore, bismuth of a high percentage has been found here. (Austin, 1863.)

**MOUNT STUART MINE** lies eighteen miles N.N.E. of the Blinman. In a mass of rock running across a gully, containing stains of copper and a good vein of ore, two shafts were sunk near the rocks, one on each side of the gully. There was some ore extracted, and blue and green carbonates, but the general aspects were not favorable for continuance of operations. One of the shafts was sunk to a depth of 10 fathoms. (Austin, 1863.)

**MULDANA MINE** lies to the north-west of Wirrawilka Mine, and about fifteen or sixteen miles east of Wonoka. It is said that a large lode runs through these sections, north and south, containing iron, green carbonates, and yellow and grey sulphurets of copper. There is no record of work done during its history—1860-9.

**MULES' YARD MINE**, county of Burra, lies near Stony Gap. This was a venture which has long been abandoned.

**MUSGRAVE MINE.**—A prospecting venture adjoining the Moonta Consols, on Yorke Peninsula.

**MUTOOROO COPPER MINE.**—This is situated about fourteen miles south-west of Cockburn railway station, and the property comprises a total area of 320 acres. The Inspector of Mines says the ore appears to be making in lenticular deposits, some being of great extent. Large masses of intrusive rocks are frequent, the point of contact being marked by ore of high grade. The surface over three lodes has been opened, and oxidised copper ores of nearly every description are found, including atacamite, azurite, malachite, chrysacolla, and cuprite. In depth, the ores change to chalcopryrite, erubescite, and chalcocite. At a depth of 140ft. in Hamlyn's shaft yellow ore intimately associated with iron pyrites is found. There has been a considerable quantity of work done, and the property has been proved at the western end three quarters of a mile from the northern workings. The quantity of ore in sight, and on the surface awaiting concentration, is enormous, perhaps not less than 11,000 tons. The ore can be dressed up to 35 to 40 per cent., and with copper at £50 the mine could profitably employ a large number of hands. At a later period (1890) he again examined the property, when a drive had been put in at the 200ft. level, where the indications led to the expression of his opinion that with further driving and sinking a higher grade ore would be met with. The lode was settled, and size unknown, but a width of 7ft. was exposed and no hanging wall in sight. The stopes in the upper levels in the north end were looking exceedingly rich, and in one place would yield fifteen tons of 40 per cent. ore per fathom. The low grade ore would average throughout 12 per cent., but at present no ore under 30 per cent. is sent away from the mine. There is an extensive mineral belt in the locality and one that will permit of permanent mining.

Captain Tregoweth, the mine manager, gives the following particulars to date :—

The area held is a mineral lease of 320 acres, and so far as developed there are three lodes ; strike N.N.E., with underlay generally 75° W.N.W. ; width 3ft. to 20ft. Deepest shafts 227ft., 210ft., 200ft., and several others ; three vertical, and three following the dip of the lode. Drives north and south on course of lodes 850ft. ; crosscuts east and west 330ft. Matrix of ore, black and brown oxide of iron, decomposed diorite and talcose rock, with iron pyrites ; country, clay slate, and micaceous sandstone, with intrusive dykes of diorite ; and the ores consist of various rich oxides, grey ore, green and other carbonates, and native copper ; output 60 tons per month. The directors have not made a call upon its shareholders since the formation of the company, but have paid over £12,000 in dividends, and, though hindered by the low price of copper recently, have done a great deal of exploratory work, and are now doing more than paying working expenses.

**MUTOOROO EXTENDED SYNDICATE.**—Property adjoining the Mutooroo. No information received.

**MUTOOROO WEST.**—Two miles from above there is a strong pyrites lode, worth thorough prospecting.

**NACKARA MINE** consists of some shallow workings, fifty or sixty miles north of the Burra. Specimens procured showed red oxide and grey and green ores. Two shafts were sunk to a depth of 12 and 6 fathoms. The lode was said to be 2ft. wide. (1867.)

**NAIRNE.**—A copper mine was opened in this place, but the workings were not continued.

**NALYAPPA** (formerly the **WILKAWAT**).—This mining adventure was taken up early in the history of mining on Yorke Peninsula, in the hope that the Moonta and Hamley lodes might be met with outside the south-western boundaries of these properties. A great deal of money was spent, and though some of the anticipations formed were realized, the result did not incite the adventurers to continue their outlay. The mine has not been worked now for a number of years.

**NAPOLEON MINE** is in the neighborhood of Mount Craig, seventy-nine miles from Port Augusta. About 15 tons of ore were taken from this mine, but it has not been worked of late years. The veinstone consists of carbonate of lime and feldspar, containing a few specks of ore. (1867.)

**NEAR'S COPPER MINE.**—The Inspector of Mines reports as follows :—This mine is situated three and a half miles north-east of Caltowie, on an outcrop consisting of metamorphic rock. Green carbonates can be traced along the surface for a considerable distance, and on this line several costeening pits have been sunk. At the east end of the claim there is some ironstone which may be the back of a lode, and at the north end in each pit there is a fine show of carbonate of copper. Samples assayed 26½ and 18 per cent. respectively. The lodes, which are in soft ground, might be developed very cheaply, and are worth testing.

**NEPOWIE MINE**, situate in the neighborhood of Wootana, has a copper lode 18in. wide, containing green carbonates, red oxides, and grey ore. (Austin, 1863.) Very little work done.

**NEW BURRA BURRA** (formerly **WARRAWILKA**).—Twelve miles east of Hawker. Seven mineral licences, comprising an area of 560 acres, are held by a syndicate. A large quantity of copper has been sent away from the old workings. Shafts have been sunk promiscuously in the highly-mineralized ground. These lodes are composed principally of calcspar, in which are shoots of carbonate of copper, which have been followed and picked out, so that it is (says the Inspector of Mines) only in one or two places that there is any copper at all in sight. The ore is of fair quality. Nos. 1, 2, and 3 shafts are all about 50ft. deep, whilst others appear to be deeper. There are three tunnels. The ground is easily worked, and likely to contain cupriferous deposits. The cost of carriage to Port Augusta is 22s. per ton. (1889.)

**NEW CORNWALL.**—(See **CORNWALL**.)

**NEW DEVON.**—(See **DEVON CONSOLS**.)

**NEW GAWLER.**—A venture by the Yorke Peninsula Prospecting Company. No records.

**NEW HECLA COPPER MINING SYNDICATE.**—Locality, North Rhine. No information.

**NEW MID-MOONTA.**—(See **MID-MOONTA**.)

**NEW MOONTA.**—A Yorke Peninsula prospect. No records.

**NEW PARAMATTA.**—(See **PARAMATTA**.)

**NEW TIPARA.**—On this property, situate near Moonta, a shaft had been sunk by a party of Moonta miners, and abandoned. They were succeeded by another set of prospectors, who were attracted by the nature of the stuff they saw on the spoil heap. They sank a shaft, but found the water too quick for their resources. After a second abandonment the Government sold the land for suburban allotments.

**NEW WALLABOO.**—Another local Yorke Peninsula venture, of which there are no records.

**NICHOL'S KNOB**, in the Mount Lyndhurst district (see also under "GOLD").—One mile east of the Knob, a good deal of work has been done on a mine showing traces

of copper. A tunnel has been driven in calcareous feldspathic and siliceous clay, and calcareous slates and sandstones, containing in the cracks carbonate of ironstones and gypsum. Other mines are in the neighborhood. In one, three parallel lines of openings have been put down on gossany lodes in calcareous slates and claystones. A good deal of work has been done on this mine for a distance of 15 to 20 chains. On a third, shafts and stopes have been put in on a gossany lode, striking N. 40° W., underlaying to the east 70°. (1883-4.)

**NILDOTTIE MINE**, twenty-three miles east of Blinman. On this property the lode is not well defined. There is, however, a lode of galena, which looks promising. (Austin, 1863.)

**NILPENA COPPER MINE**.—Situation, near Parachilna Gap, Flinders Range, about ten miles from the railway station; area 240 acres, held under Crown leases. There are four lodes, of which only two are worked; width 10ft., and widening as depth is reached. Two shafts have been sunk to a depth of 60ft. following the dip of the lode. An adit 130ft. and a level 30ft. have been driven. Ore, carbonate and grey and black oxide; assay 26½ per cent., containing rock, clay slate. The lodes crop up at the tops of high hills. The Inspector of Mines reports that from the latter, when he visited the mine in February last, 62 per cent. ore was being raised. The lode in the bottom is widening out, and will probably make a good-sized shoot of ore. The mine should prove payable as development advances.

**NITSCHKE MINE** is near Freeling, in the hundred of Nuriootpa. It was opened more than thirty years ago and worked for a time, and subsequently about the year 1869. There are numerous shafts, one of which is 200ft. deep. The veins have a strike N. 10° E. The veinstone associated with the ore is calcareous spar, the rocks are crystalline limestone, white marble, and talcose schist. (May, 1886.)

**NONPAREIL**.—A costeening prospect near Kadina; no record beyond the fact of such a venture having been pursued for a time and then abandoned.

**NORTH BRITAIN**.—Locality, north of Port Wallaroo. No record of operations.

**NORTH DEVON**.—A discovery near Kadina. The work was limited to costeening.

**NORTH-EAST DOORA**.—Situation, near the Doora. No records obtainable.

**NORTH-EAST MATTA**.—A prospect near the Matta Matta, Kadina. No record of results.

**NORTH-EAST MOONTA**.—A large company was formed under this name to prospect in the mineral country midway between Moonta and Kadina, and, in the course of a great deal of costeening work the backs of two or three lodes were opened to view; and in one place a shaft was sunk to a depth of 20 fathoms, and a drive was put in, but as the lode did not promise satisfactory results and the water required pumping machinery, that, and other trial shafts on some of the twenty or thirty sections held, was abandoned.

**NORTHERN CONSOLIDATED MINING PROPRIETARY**.—Thirty-six claims, each 80 acres, north of Port Augusta, including a number of partly developed mineral properties.

**NORTH KAPUNDA MINING COMPANY**.—Established 1846; stopped working in 1851, owing to the general collapse of that period.

**NORTH MUTOOROO COPPER MINING COMPANY**.—Locality, adjoining Mutooroo Mine, and near Cockburn. Six hundred and forty acres are held from the Crown

under a ninety-nine years lease. The company are endeavouring to discover a continuation of the Mutooroo lodes, but at present comparatively little work has been done.

**NORTH POONA.**—Situation west of Moonta and Wallaroo tramway, near the Poona Mine. Costeening revealed the back of a lode, upon which a shaft was sunk 17 fathoms. Black oxide was found, but not in payable quantities. Further sinking exposed a well defined lode, 3ft. wide, in an easy channel of ground. Lack of capital stopped all further operations.

**NORTH RHINE MINE** is situated about ten miles from Angaston. Two lodes run nearly parallel in a north and south direction, with an underlay towards the west of about 18in. in the fathom. The ores found near the surface were green and blue carbonates. Three shafts were sunk, the deepest being 43 fathoms, and a drive of 70 fathoms was put in. At 20 fathoms the lode was 4ft. wide, and was composed of ore, mundic, and spar. Owing to the large proportion of mundic, the lode proved unremunerative. The mine was first opened in 1849-50, and was worked till 1851; from that date to 1859 it lay idle, but was reworked from 1859 to 1862-3. (Austin, 1863.)

**NORTH TUNGKILLO MINING COMPANY** were sub-lessees of the Australian Mining Company. After £519 had been spent on the mine, the results not being payable, the mine was abandoned.

**NORTH WALLAROO.**—Situation near Kadina, north of Wallaroo Mines. Land was taken up by a prospecting company, who enlarged the undertaking and formed a limited liability company. They kept three miners at work for about nine months, and work then ceased.

**NORTH YELTA.**—Adjoining the Yelta mine, near Moonta Mines. Worked for some years, and believed to be now incorporated with the Yelta property.

**NUCCALEENA MINE** lies thirteen miles N.W. of the Blinman. The open workings indicate that the ore-deposit is a true lode. It is in a flat curve, having a mean strike of W. 20° N., and crossing the steep slope of a hill of medium height, traverses the beds of the country. The strike of these is N. 45° W., with a N.E. dip at an angle of about 33°. The underlay of the lode and its thickness near the surface appear to have been very irregular. The rocks near the lode, in depth, consist of hard blackish, thick bedded, calcareous slate, but at the surface they are yellowish-white, rather soft, and full of veins and small patches of brown iron ore with green copper stains. The examination of the metallic and other minerals, as seen in a large heap of ore on the dressing floor, gave the following result:—Ochreous gossan, enclosing massive patches and druses of acicular crystals of atacamite, generally associated with some malachite and silicate of copper, patches of tile ore, a few small veins and patches of red oxide of copper, and still fewer specks of native copper. Mammillary brown iron ore and calcite appear frequently in irregular cavities. From below the water level, massive, coarsely, crystalline, spathic iron, full of specks, patches, and seams of copper pyrites, associated with a little iron pyrites, quartz, crystalline, and in veins, occasionally white calcite imperfectly crystallised, in druse cavities. (Ulrich, 1872.) A great deal of work was done on this mine, but it was ultimately abandoned.

**OLADDIE or EXETER MINE** is in the hundred of Eurelia. The claim was taken out on account of good surface indications, but the prospect was never developed. (Date of holding, 1860-9.)

**OLADDIE MINE.**—Situated on an educational lease about ten miles from Orroroo,

in the Bendleby Ranges, which is favorable for carrying mineral lodes. Describing this venture as seen on a recent visit, the Mine Inspector states that there are several outcrops of lodes crossing each other obliquely, and on the surface can be seen specks of copper distributed through the limestone capping. A tunnel has been driven apparently on the hanging-wall of a large formation, about 2 per cent. of which is copper. A picked sample selected by the Inspector gave  $12\frac{1}{2}$  per cent. of copper and 1dwt. of gold per ton. The prospect suggests further development, and the district as a whole is worthy of attention. (1889.)

OLD NOLL'S MINE adjoins the Daly Mine at the south-west corner of the section. It is on a hill of considerable elevation, and contains a fine deposit of green carbonate and red and grey oxide of copper in a large reef of rocks running for some distance along the top of the range. (Austin, 1863.)

ONKAPARINGA COPPER MINE is on the Echunga goldfields. There is no indication of copper at the surface, but a well-defined quartz reef with pyrites strikes north and south with a dip  $30^\circ$  west. It is in sandy micaceous slate of the same dip, and underlies false-bedded micaceous sandstone and grit. This reef was originally prospected for gold. A shaft 30ft. deep was put down alongside the reef, and a tunnel was driven in the side of the hill to within a few feet of the shaft, at about 20ft. from the surface. In connecting the drive with a tunnel the present (1884) holders of the mine struck a mullocky copper lode, which makes and leaves the reef at 18ft. from the surface, running vertically down. The minerals contained in the lode are crystalline quartz, pyrites, chalcopryite, native copper, chalcocite, malachite, and azurite. Two miles eastward, on a hill, is a lode formation with a quartz reef, containing copper stains and small crystals of atacamite. (1883.)

ORALDANA MINE is sixty-eight miles N.W. of the Blinman. The copper ore occurs as an impregnation in a ferruginous quartz-pebble conglomerate. This covers an area of several square chains, and from it rise two craggy, highly silicified, irregular masses of from 8ft. to 12ft. high, and standing about two and a half chains apart. These outcrops, as well as the mass between, show abundant copper stains and coatings in every joint and crevice. They also contain small pockets filled with soft, white, arenaceous clay, through which little nodular concretions of malachite are scantily distributed. On being broken the softer parts of the rocks show specks and thin seams of grey oxide of copper, whilst the larger malachite nodules often contain this ore in the centre. Very little work was done on this mine. (Ulrich, 1872.)

ORATUNGA MINE lies on the southern slope of a low range about twelve miles N.W. of the Blinman mine. The ore deposit represents a so-called pipe vein 12ft. to 14ft. in width, and from 6ft. to 8ft. thick, with well-defined walls, dipping eastward at an angle of about  $60^\circ$ . Brown, much cleaved, flaggy slates alternate with greyish-white argillaceous ores. The strike is N.  $5^\circ$  W., and the dip in that direction is somewhat steeper than the slatebeds, which strike N.  $40^\circ$  E., and show a N.W. dip of  $15^\circ$  to  $20^\circ$ . At the outcrop the ore consists of an ochreous gossan, full of small patches, irregular veins, and fine druses of acicular crystals of malachite. There are occasionally similar druses of aragonite associated with it. In depth the ore changes to coarsely crystalline chalybite (carbonate of iron) full of small patches and seams of copper pyrites, and generally associated with quartz. The stoppage of the mine is said to have been caused by the deposit being faulted in depth by a slide, and that the search for it became too expensive. (Ulrich, 1872.) This slide was met with at a depth of 12 or 13 fathoms, and a floor came in having a slope of about  $25^\circ$ . This was followed down until the work was stopped by water. The depths of the shafts ranged from 6 to 15 fathoms. (Austin, 1863.)

ORIENT.—(See CUMBERLAND.)

**OROTUNGA COPPER MINE.**—Locality, twelve miles west of Blinman Mine; area, eighty acres of land leased from the Crown, carrying a lode striking north and south, and 13ft. wide. Five shafts have been sunk, two vertical and three following the dip of the lode, which contains green malachite and copper pyrites. In the north portion of the mine the lode is composed of chalybeate and spathic iron and copper pyrites. The mine was worked in former years, and it is believed large quantities of copper could yet be obtained from it. (Captain Doble, Blinman.)

**OVERLAND CORNER.**—A copper mine was opened here many years ago, but nothing payable was found. (1867.)

**PALAWARTA MINE.**—(See MOUNT RUGGED.)

**PARABARANA MINE** is situated at Parabarana Creek, eighty-four miles east of Farina, and about two miles S.E. of Parabarana Hill. It has three distinct lodes, two running north and south, and one east and west. Two pits have been sunk, and in each blue and green carbonates have been found. This mine has been worked recently; but we have no information as to results.

**PARA MINE.**—Twenty-five miles N.E. by N. from Adelaide. The indications were good, but work was suspended, as in many other instances, in 1851.

**PARAMATTA MINE.**—This mine, situated a little north of Moonta, was worked for many years, with a fair yield; but the country became so hard, and working so difficult and expensive, as compared with results, that operations were suspended, and the mine has remained idle now for about ten years.

**PARARA MINE.**—This was a working near Ardrossan, on Yorke Peninsula, the surface indications being very promising. After sinking a shaft and driving for some time the adventurers ceased working, the available capital having been exhausted.

**PARATOO COPPER MINE.**—This mine is described by the Inspector of Mines as situated in a locality favorable for cupriferous lodes. Small outcrops of manganic iron run east and west showing copper. Picked pieces of copper ore from this outcrop assay as much as 62 per cent. metallic copper. Two shafts sunk 70ft. are connected by a drive. The bunches of ore are very irregular, but the sinking has not yet reached settled country, so the value of the mineral deposit has never been ascertained. The sinking is easy. (1889.)

**PARINGA MINE** is in the neighborhood of the Bremer and Kanmantoo mines, thirty-six miles from Adelaide. About 900 tons of ore were said to have been raised by tributors, who ceased work when they came to the water-level; but the mine has been abandoned for many years. [See **PARINGA MINE**, under head of "SILVER-LEAD."]

**PEELA WEELE.**—This was a prospecting venture on land lying to the north-east of the Wandilta Mine, where a show of green carbonates induced a search for a lode. The effort was not successful; no records.

**PENANG.**—One of the ventures outlying from the Moonta Mines some little distance. There was a good strong lode opened upon, containing gossan and iron, but a very slight search satisfied the prospectors.

**PHILLIPS MINE, Rapid Bay.**—Copper lodes were found cropping out of the surface of the ground. The ores consisted of grey, yellow, and peacock ores. (See under "SILVER-LEAD.")

**PHOENIX.**—A Yorke Peninsula prospect; no records.

**PHOENIX MINING Co.**—Established 1850. The property was situated sixty miles north of Adelaide, near Tothill's Gap. It had stopped working in 1851, when the rush for gold mining set in.

**PINDILFENA MINE** is situated on the Parallana Range, west of the Yudnamutana Mine. The ore deposits were green carbonate and grey ore. The lode runs nearly east and west for 70 or 80 yards, and varies in width on the surface from 2ft. to 6ft. (Austin, 1863.)

**PINE HUT MINE.**—Fifty miles N.E. of Adelaide. No records obtainable.

**POONA.**—This mine is situated very near to the Moonta Mines, and its discovery was due to the exposure of a lode by the excavation of a rather deep cutting on the Moonta and Wallaroo tramway. It was regarded as a very promising mine, and sent away a considerable quantity of marketable ore. It was one of the very many small mines that ceased work during the depression in the copper market in the '70 decade.

**POONAWURTA MINE.**—Forty-two miles N.E. from Adelaide. A company, established in 1846, after spending a considerable sum of money on the property without obtaining any satisfactory results, sold the land for £1,000, and the working ceased.

**PORT LINCOLN MINE** is situated four miles from Tumby Bay. A fair amount of good ore has been raised from this mine at different times, but the hardness of the ground is an obstacle to its being profitably worked. (Austin, 1863.) Several shafts were sunk, but the influx of water was very considerable. The property comprises seventy acres.

**PREAMIMMA MINE.**—Thirty-eight miles S.E. of Adelaide, and about six miles N.E. of Callington. The mine was opened in 1854, and some good ore, chiefly carbonates, was raised. After a time, the lode being lost, the mine was abandoned. It was re-opened for a short time about the year 1862, and the engine shaft was sunk to a depth of 47 fathoms. Some black ore was found, but not in paying quantities. Mundic was met with throughout the workings, and also some muriate of copper. (Austin, 1863.)

**PREMIER MINE.**—This copper mine is situated about a mile and a-half from New Luxemburg, and from the Mingary and Queen Bee Gold Mines. A vertical shaft has been put down, and (says the Inspector of Mines) at about 11 fathoms it reached a very heavily-mineralized country, with thin veins of sulphides interlacing in all directions. The indications are very favorable, and it is considered an excellent prospect. The lode sunk upon is said to carry silver in small quantities. (1889.)

**PRINCE ALBERT MINE.**—Situated not far from Moonta, but there are no records of operations.

**PRINCE ALBERT'S MINE.**—No history; locality, nine miles E.N.E. of Adelaide.

**PRINCE ALFRED MINE** is situated twenty-eight miles N.E. of Carrieton, on the Great Northern Railway. The ore deposit is very interesting, on account of its presenting a fine example of the so-called bedded or layer lode, *i.e.*, it lies both in strike and dip, between the strata, grey, flaggy clayslate. It strikes W. 5° E., and dips W. 5° N. at 45° to 50°. It has been traced for nearly twenty chains in length, showing, as far as exposed, a thickness varying from 3ft. to above 20ft. The deposit consists of a confused accumulation of large and small masses of clayslate, connected and traversed by veins of calcite. Through this mass malachite is thickly distributed in seams, coatings, and irregular patches, associated with brown iron ore. Towards,



and below the water-level, at about 20 fathoms, the green carbonate and brown iron ore give way to a dense impregnation, fine veins and massive aggregations of copper pyrites, but slightly intermixed with iron pyrites, and occasionally associated with small particles of spathic iron and white calcite. In one place the lode is very rich, and is taken out for nearly 20ft. in width. The distribution of the copper ore is not uniform, but varies in richness throughout the workings. (Ulrich.) Three shafts were sunk in different places on the property, but only one at the principal workings. Large stopes were opened out from the surface down to about 20 fathoms. The greatest depth of any shaft was about 40 fathoms on the underlay and the water level was reached at 150ft. Drives were put in for some hundreds of feet. The mine has not been worked since 1872, until recently, when the water was pumped out of the upper levels, and machinery was provided for making the ores marketable. At the present time operations are being carried on in a very limited fashion, the main effort being apparently to make the mine pay its own expenses. The prospect is very encouraging, and deserves a liberal expenditure of capital. The Inspector of Mines recently visited this property, and in his report upon it, says that, working as it is at present, under difficulties, on a small scale, and with primitive raising appliances, the mine pays excellently; with a plant capable of dealing with a large quantity of ore it would pay handsomely and become an important undertaking. The lode is a very large one, ranging from 12 to 20ft., and through the whole matrix there are veins of very rich ore distributed irregularly. The course of the lode is north 10° E. with a dip W. at an angle of 45°. Can be traced for a mile, and has been opened on the northern boundary, where a small but compact lode of high-grade copper ore is shown.

**PRINCESS ROYAL MINE** adjoins to, and was found prior to the Burra Mine. Considerable success attended the early workings of this mine. A quantity of ore was raised, and showed an average of over 27 per cent. of copper. In 1851 water was reached at the 30-fathom level. The capital of the company was expended, and the mine was therefore abandoned. The total proceeds of the ore raised were about £7,000. The land (10,000 acres) was sold for a sheep run. (Austin, 1863.)

**PRINCE OF WALES.**—A prospecting venture near Moonta, where, in 1873-4, costeening was carried on by a small syndicate until pecuniary resources were exhausted. No records.

**RAE'S CLAIMS.**—Situated west of Crocker's, at Mutooroo. The Inspector of Mines considers the property presents every inducement for working.

**RAWNSLEY'S BLUFF MINE** is about fourteen miles east of Mernmerna (Great Northern railway), and S.W. of the bluff itself. A strong reef of ironstone shows on the surface for 250 or 300 yards, and contains some good stones of green carbonate of copper. (Austin, 1863.)

**REEDY CREEK MINE.**—(See TUNGKILLO.)

**RHONDDA MINE**, four miles north of Carrieton. The claim was for a time worked, but no records are obtainable.

**RHYNIE**, seventy miles from Adelaide, and four miles west of Riverton. A copper mine having rich indications was worked here by Messrs. Nickolls Bros. in 1867.

**ROSEWORTHY**, thirty-one miles north of Adelaide. A copper mine is said to have been opened at a place two miles N.W. from the township in 1867.

**ROYAL MINE.**—Situated in the Moonta district Yorke Peninsula. No information procurable.

**ROYAL MINING COMPANY OF SOUTH AUSTRALIA.**—This company purchased 720 acres of land, chiefly in the neighborhood of Kapunda, at a cost of £1,500, but no important discoveries were made. Established December, 1846. Amalgamated with the Emu Flats Association, June, 1850. (Period, 1845.)

**RYAN'S COPPER CLAIM.**—The Inspector of Mines visited this claim, situated in the hundred of Uroonda, in February last, and states that two small shafts have been sunk on the underlie of a copper lode, which dips at an angle of 30°, the size of the branch varying from 4 to 12 inches. It is enclosed in a talcose schist, and would be inexpensive to work. The ore goes up to 45 per cent., and the mine looks very promising.

**SCOTT'S CREEK MINE** is about eighteen miles from Adelaide, near Cherry Gardens. It is on the side of a steep, but not very high hill, on the surface of which, in ironstone rock, some strong stains of copper were found, and a shaft was sunk. The ore was chiefly grey oxide, mixed with a little green and blue carbonate. The lode was small, but regular and well defined; at the depth of 5 fathoms there was but little ore, the lode being chiefly composed of gossan. The lode is nearly a downright one, having but little underlay. (Austin, 1863.) The Inspector of Mines, after visiting this mine a little while ago, described it as distant a mile and a-half north of the Aclare Mine, and though the locality was favorable for copper as well as silver mining, referred it to the latter series. (See "SILVER MINES.")

**SCRUBBERS' CAMP MINE** is situated about twenty-eight miles north of Koorunga. There are several shafts sunk, and promising ore was found, principally blue carbonates. The ground is soft and easily worked. (Dates back to 1867.)

**SHEAOAK LOG**, four miles east of Roseworthy.—A copper mine is situated about three and a-half miles E.S.E. No records of working obtainable.

**SIR DOMINIC MINE** adjoins the Daly Mine, about five and a-half miles E.N.E. of the Yudnamutana Mine. The range rises to a height of 400ft., and its crest consists of an immense rugged mass of ferruginous, highly fractured quartzite, forming a nearly perpendicular wall of over 100ft. in thickness. On account of the mode of occurrence of the copper ore, this mass closely resembles the quartzite layer of the Daly Mine, but the ore contents of the pockets are not so rich as are those of the latter. The rocks of the district present the same varieties as those near the Yudnamutana Mine. (Ulrich, 1872.)

**SLIDING ROCK MINE**, 132 miles N.N.E. from Port Augusta, is situated on the south side of Sliding Rock Creek, at the base of a hill of medium height composed of hard limestone. The main ore deposit is a lode varying from 1½ft. to 10ft. wide. Its course is tortuous, and has a mean strike of N. 20° E., and with an eastward underlay of 3ft. in the fathom. It traverses the beds of the country, which strike W. 20° N., and dip southward at an angle of about 60°. The walls, which are fairly well defined, consist, on the eastern side, of a blackish aluminous shale, resting against a hard bar or reef of impure brown iron ore; and, on the western one, of soft, sandy, concretionary light-colored shale, which, near the surface, is more or less thickly stained with blue and green carbonate of copper, and brown iron ore. The existence of the ironstone reef in the eastern wall is of great value to the mine, for the reason that it dams back a seemingly great accumulation of water in the rocks behind. At the surface the ore consists of rather earthy, and not very rich-looking, carbonates; but it changes in depth to an association of red oxide of copper, native copper, green and some blue carbonates, in a soft, clayey, partly ferruginous matrix. The red oxide occurs frequently in large crystalline, granular, and vein-like masses; the native copper in pure crystallised masses, occasionally several cubic inches in size; and the carbonate—mostly malachite—forms veins and druses in connection with the former. Beneath

the water level, traces only have as yet been discovered of black sulphide of copper-ore. About the middle of the length of lode opened, the latter is traversed, without being faulted, by a crosscourse of 13ft. in width, and striking W. 17° N. This crosscourse carries ore similar to that of the main lode, and has been followed for 7 fathoms towards the west. The limestone, of which the hill is composed, is greyish-black, micro-crystalline, hard and tough, and, according to chemical analysis, contains a large percentage of magnesia, some silica, and carbonaceous matter. (Ulrich, 1872.)

**SMITH'S COPPER MINE.**—A lode of copper has recently been found near King's Bluff, in the north-east district. It strikes N.W. and S.E., and can be traced along the surface of the ground for some distance. An excavation has been made on a rubbly broken cap of the lode to a depth of about 10ft., and several tons of ore have been raised. Sufficient work has not been done to prove the value of the lode, but its appearance is very encouraging. The rocks with which it is associated are quartzite and quartzose sandstone, and granite. (1887.)

**SOUTH AUSTRALIAN COMPANY'S COPPER AND LEAD MINES.**—Situated at Rapid Bay. English assays gave 19 per cent. copper, 66 per cent. lead, and 14oz. 15dwt. silver. (Dutton, 1846.)

**SOUTH CREEK COPPER MINE** is about four miles north of the Burr well, on a large creek. It has been worked on three lodes. Two of these to the south are parallel lodes 3ft. apart, in a calcite reef, with well-defined walls. These dip 82° south, and are easily traced for some distance on the surface. The ore in this lode consists of green carbonates in kaolinized slate. It was worked to about 70ft., when the water level was struck, and operations were discontinued.

**SOUTH DEVON.**—This mine, situated between the Duryea and the Doora, not far from the Wallaroo Mines, had two lodes, which were discovered by costeening. A shaft was sunk on the south lode to the depth of 22 fathoms, and a crosscut was driven to the parallel lode, which was from 2ft. to 3ft. wide, and carried a little yellow ore. A good deal of work was done, but nothing has been heard of the mine since the depression in prices of copper occurred.

**SOUTH DOORA.**—This was the holding of a prospecting syndicate, intent upon finding a continuation of the Doora lode. No records extant.

**SOUTH-EAST DOORA.**—A similar venture, upon a strong show of iron and gossan. After considerable trial the claim was abandoned.

**SOUTH-EAST MOONTA.**—No records of work done.

**SOUTH HAMLEY.**—Situated near Moonta; no records.

**SOUTH KAPUNDA MINING COMPANY.**—Established 1850, and its property was situated between the Kapunda and North Kapunda Mines. No record of its workings is now obtainable, and it appears to have stopped in 1854.

**SOUTH KURILLA.**—No information procurable.

**SOUTH MOONTA.**—This claim was about two miles south of Moonta Mines, and the adventurers essayed the discovery in their three sections of the continuation of the lodes of that grand property. They costeened down to a depth of 30ft., and in two places got very favorable indications. The local company soon exhausted its capital and operations ceased.

**SOUTH WALLAROO.**—(See DEVON CONSOLS.)

**SPEAR CREEK.**—There is a copper lode lying twelve miles east of the township of Stirling North; unworked.

**SPRING CREEK MINE**, thirty-five miles from Port Augusta and eleven miles north of Melrose, is situated on the northern end of Mount Remarkable. A small drive of about two fathoms has been made about 120ft. above the level of the creek, into the hill, and shows several veins of red oxide from 1in. to 6in. in thickness. A reef of rocks running up the face of the hill contains numerous stains of copper. On breaking off pieces of rock where these stains occur, ore is almost invariably found; in some cases blue and green carbonates, but more frequently red oxide and ruby ore, and sometimes a little native copper. (Austin, 1863.)

**STAINBANK'S MINE.**—Situated on private lands at Fifth Creek, and the ground is composed of clay, slate, and sandstone, traversed by numerous quartz and iron reefs. A tunnel driven into a hill 250ft. has intersected a small mullocky reef, from which samples give on assay gold, silver, and copper in small quantity. The mine is within an auriferous belt of country. (Inspector of Mines, 1889.)

**STANDARD.**—A Yorke Peninsula prospecting organization started under this name, but left no mining history.

**STANLEY MINE**, seventy-six miles N.E. from Blinman mine, and four miles east of Yudnamutana mine, lies in a low hilly district or basin, surrounded by high ranges. The country consists of metamorphic slates and sandstones, which strike W.  $15^{\circ}$  to  $20^{\circ}$  N., and dip southerly at angles varying from  $60^{\circ}$  to  $85^{\circ}$ . There are four separate lodes, much resembling one another in mineral character. The one nearest the Daly mine lies on a low range, and crosses micaceous slate. It is from 2ft. to 4ft. thick, and at the surface is composed of gossan, beneath which succeeds slaty and clayey mullock, with argillaceous veins, and also patches and veins of quartz and calcite. Judging from some specimens left on the surface, the ore seems to consist of concretionary lumps and irregular veins of malachite and azurite. Some of the gossan ore, on chemical examination, showed very faint traces of bismuth. The length of the vein appears from the workings to be only about one and a half chains, its strike N.  $30^{\circ}$  W., and its underlay W.  $30^{\circ}$  S., at an angle of  $55^{\circ}$ . The walls are not well defined. About the centre of its length it makes a sharp turn W.  $30^{\circ}$  N. for about 6ft. The workings are—a deep underlay shaft communicating with a vertical one sunk to the depth of 30ft., where it strikes the underlay of the lode. Another vertical shaft, about 50ft. deep, lies in a gully in the line of the strike of the lode, and about five chains north of the underlay shaft, but neither traces of lodestone, nor even copper stains, are observable in the spoil heaps around it. The second lode lies about twelve chains east of the first one. The ore occurring in depth consists of brown iron ore, enclosing patches of copper pyrites, iron pyrites, malachite, and azurite. The workings consist of a short trench and an underlay shaft apparently 55ft. deep. Judging from these the ore seems only to extend for about 15ft. in strike. The strike of the lode is W.  $30^{\circ}$  N., and it dips S.  $30^{\circ}$  W. at an angle of about  $65^{\circ}$ . Its hanging wall is well defined, and is represented by a strong reef of quartzite. The footwall is less regular, and consists of micaceous slate. The third lode lies about eleven chains S.E. of the foregoing one, and much higher up the range. The ore enclosed in the outcrop is of a far superior quality to that of the others, consisting of veins and solid lumps of malachite, azurite, and tile ore, embedded in cupriferous brown iron ore. Both the carbonates appear also frequently crystallised in cavities. The presence of bismuth ore could only be detected by chemical examination. Traces only of it could be found, notwithstanding that it had been reported to have occurred in large quantities. The workings consist of underlay shafts—one apparently 60ft. in depth—and shallow excavations on either side. In a distance of not more than one and a half chains the lode showed great irregularity of strike and dip—the former being in the mean W.  $15^{\circ}$  N.; the latter, according to

the main underlay shaft,  $80^{\circ}$ , in a shallow excavation on east end, about  $45^{\circ}$  southward. The thickness of the lode varies from 2ft. in the western to above 8ft. in the eastern workings. The fourth lode is similar in character to the third lode. Its features, more especially conformity in strike and dip, indicate that it and the foregoing ones are "makes" of the same great lode, the fissure of which is closed, or perhaps only indistinct on the surface between. The workings comprise a small excavation on east side, and close to the gully, and a tunnel of about one chain in length driven into the hill opposite. At the opening of the tunnel there is a rugged protrusion of quartzite, traversed by quartz veins. (Ulrich, 1872.)

**STREATHALBYN MINES** were originally opened by private enterprise in 1848. Some good copper ore was raised and smelted on the property. The mines were afterward sold, but were never re-worked. (Austin, 1863.)

**TAREE.**—On a claim situated east of the Derrington mine, near Moonta, prospecting was carried on for the discovery of the Derrington lode, but without success, and the venture collapsed. (1873.)

**TEATREE COPPER MINE.**—The Inspector of Mines reports an examination of this property, situated four miles from Arrowie Station, in September last. A fine outcrop of copper-stained ironstone can be traced for a mile on a course S.  $20^{\circ}$  E., dip E.  $20^{\circ}$ . A shaft has been sunk 20ft. on a lode formation of 3ft., which carries low-grade ore. The distance of cartage and low price of copper make this a second-rate prospect. (1889.)

**TIDDY WIDDY.**—This was the name of a venture not far from Ardrossan and the Parara mine, Yorke Peninsula, which was regarded as having very good prospects. It was abandoned because of lack of capital. (1873.)

**TORRENS RIVER MINE.**—Sec. 5536. No records.

**TOWER HILL MINE** lies between Tower Hill and the Avondale mine, and is about twenty miles S.E. of Farina. The lode is about 6in. to 8in. wide, with no defined walls. As it goes down it is improved in bulk by the addition of small leaders, and is dipping  $30^{\circ}$  to  $56^{\circ}$  E., whilst the rocks, which are calcareous slates, dip  $75^{\circ}$  N. The workings consist of an underlay shaft of about 60ft. in depth, and from there the lode has been followed by a drive for 40ft. without any apparent change. The ore consists of chalcocite, with stains of malachite and a little chalcopyrite and atacamite. About 20ft. south of the lode is a well-defined reef of calcite with copper stains. It is probable that this will join the lode lower down, when it will assume a more definite character. (1884.)

**TRESEVEAN MINING COMPANY**, a lease from the Britannia Mining Company, Tremer. Stopped in 1851. No records. (Period, 1854.)

**TRINITY MINE.**—Adjoins the Mutooroo mine. No further information received.

**TRURO MINE.**—This property, situated about six miles from Kadina, in the neighborhood of the Cornwall mine, taken up as a prospecting venture, was long ago abandoned, no results adequate to outlay having been met with. (1873.)

**TUMBY MINE** is eight or nine miles north from Tumby Bay, Spencer Gulf. The lode is 3ft. 6in. wide, and consists of blue and green carbonates, gossan, and spar. Two shafts were sunk—one to a depth of 9 fathoms and one to 7ft. (Date, about 1867.)

**TUNGKILLO OR REEDY CREEK MINE**, the property of the Australian Mining Company, is thirty-four miles north-easterly from Adelaide. The company was

formed in 1845, and operations were begun a year or two later, and were continued up to 1852, when the works ceased. During that time the money spent in developing the mines at Tungkillo and Charlton amounted to upwards of £108,217. A number of shafts were sunk, and the work was conducted in accordance with the most scientific methods of the day. The ores were rich in quality, but "bunchy"; the lode worked was over 30ft. wide. The ore taken out reached 22 per cent. for copper, on the average. Referring to the "Royal South Australian Almanac for 1848," it is there stated that the Tungkillo mine contained emery, and that in December, 1847, 100 tons were sent to Port Adelaide for shipment. The following account of this mine is taken from an article, dated 1850, in "Iron," volume VII:—

There were two lodes at the north end of the property and six at the south. Near the former the ground was dark-grained micaceous granite. Above the water level of the mine there were carbonates, black oxide, and black sulphurets, and below the level copper pyrites. Iron was conspicuous in all the lodes, and the rock was very hard. The mine contained a chamber 20ft. high, from which had been taken an immense bunch of ore. When, however, this bunch was quarried out the lode suddenly contracted and soon passed off into mere strings. Efforts to secure better ground or to find another bunch were unsuccessful.

On Baker's lode the workings comprised two shafts of 60 fathoms and 40 fathoms respectively. At the 40-fathom level there was an adit and railway 198 fathoms in length, and in addition there were three other levels of 95, 70, and 30 fathoms in length. (See under "GOLD.")

TWO BROTHERS MINE is situated about two miles north of Nuccaleena. The indications were good at first, a lode of rich oxide 2ft. in width being traceable for the whole length of the section; but when sinking and driving began the lode was lost. (Austin, 1863.)

UKAPABINGA MINE.—In March, 1869, the Inspector of Mines reported on this property, which is situated about a mile and a half from Williamstown, and was first worked in 1850, under the name of the Wheal Friendship. He says that copper ore, raised in limited quantities, produced as high as 45 per cent., but the general bulk was of low quantity. In later years it has been worked at different periods by parties of tributors, but is now idle. There are two lodes, one N. 10° E., the other N.E., with probability of conjunction at the south end of the claim. An adit level cut the north lode at the depth of 100ft., and it was proved by a winze to a further depth of 95ft. The lode formation is very poor in copper, but is bunchy, averaging not more than 4 per cent. ore, which could be dressed up to 35 per cent. In the bottom the bulk of the lode is white quartz, traversed by small veins of good ore. There is a large quantity of ground opened up ready for stoping. On the south end of the claim a tunnel has been driven 200ft. hillwards, intersecting both lodes. In the end the north-east lode is fully 12ft. wide, with regular, well-defined walls, carrying a fair percentage of yellow ore. There is, the Inspector says, some probability of gold being found in this mine.

ULOOLOO COPPER MINE.—Three miles east of the Ulooloo railway station 100 acres of private land are held on lease, in a mineralized belt of country, bounded on the south by a high range of granitic and gneissic rocks. The Inspector of Mines reports that creeks run eastward from the range, which give auriferous indications. A few feet south of a strong outcrop of iron a vertical shaft has been sunk 108ft., and a crosscut thence intersected the iron lode, 18ft. thick. The country is congenial for stratified deposits of copper—in fact copper is distributed in slugs on the surface for 200ft., and the ground, composed of quartz, hornblende, feldspar, and carbonate of lime, has nodules of green and blue carbonates interspersed, besides here and there red oxide of copper. There are two other outcrops on the property, one of quartz and the other of iron, which have not yet been tested. The nature of the ground makes the work of exploration comparatively inexpensive. (1889.)

**UMBERATANA MINE.**—The Inspector of Mines reports that this claim is on the mineralized range of hills that contain the Yudnamutana, Daly, Stanley, and Wheal Turner Mines, and is situated about three miles north of the latter. No work has been done, but there is a lode carrying carbonate of copper, which can be traced through the claims. It is of too low a quality to pay for dispatch from such an inaccessible locality. (1889.)

**UNITED CONSOLS.**—This was a claim taken up on the strength of the mineral indications found in the Nonpareil Mine, which it adjoined on the north side. No records. (1873.)

**UNITED EXTENDED.**—A prospecting venture a short distance east of Kadina. No further information obtainable.

**UROONDA LODES.**—(See RYAN'S COPPER CLAIM.)

**VESEY'S CLAIM** is about ten or twelve miles N.E. of Nuccaleena. There is a well-defined lode running nearly through the section containing rich ore, green carbonate and grey oxide, and some of the latter is said to contain 70 per cent. of copper. The country consists of clayslate and pipeclay. But little work has been done. (Austin, 1863.)

**VICTORIA MINE.**—Situation, mining district, Yorke Peninsula. No information accessible.

**VICTORY MINE** is on the top of a hill about 80ft. high, three miles east of Mount Bourne, and thirty-two miles N.E. of Beltana township. The hill is composed of quartzite, dipping to the south. The lode runs north and south, and dips E.  $68^{\circ}$ ; it is from 9in. to 4ft. in width; has a well-defined foot wall, but no hanging wall. The ore consists of chalcocite with malachite, atacamite, dark oxides and sulphides. It runs in a shoot to the N.  $45^{\circ}$ , from 30ft. to 40ft. long and 20in. wide. The mine has been worked to a depth of 170ft. by an underlay shaft without striking water. The lode has twice pinched out and made again. Three shafts have been sunk, and drives to the extent of 100ft. made on the course of the lode. Three hundred tons of ore have been sent away during the last year or two, averaging, it is said, about 31 per cent. (1884.) The mine is not now being worked. (1887.)

**VOCOVOCANA MINE**, west of Apex Hill, has a well-defined north and south lode, and good grey ore has been raised from it. The lode shows for about 200 yards on the surface. (1860-9.)

**VULCAN.**—This was a claim taken up about six miles S.E. of the Wallaroo Mines. In costeening a nice deposit of ore was found, and prospecting shafts were sunk, but the lode from which this bunch of ore was supposed to have been derived was never discovered, and the claim eventually reverted to the Crown.

**WAKEFIELD MINE**, sixty-nine miles north of Adelaide. In 1845 a copper lode of considerable regularity was operated upon in this claim, and some cwts. of copper of good quality were produced. (Date, 1848.)

**WALLAROO MINE.**—This mine was discovered in 1860. It is situated on Yorke Peninsula, and is ten miles north of the Moonta Mine, and now includes the Kurilla. It occupies rather over 2,000 acres of Crown lands. There are five lodes on the property, and there is the Kurilla lode. The main lode is nearly vertical, although occasionally the underlay is a little to the north, and sometimes a little to the south. Strike of lodes,  $10^{\circ}$  to  $20^{\circ}$  south of east. The lodes vary in width from a few inches to twelve or fourteen feet, and the ore they contain is chiefly chalcopyrite. As raised from

the mine it varies from 3 to 10 per cent., with occasionally small quantities of rich ore. The deposits of copper ore are chiefly along the lead of the lodes, and are associated with "gangue." The present supply is mostly chalcopyrite. There are no regular shoots. In connection with the limestone just over the lode, a little green carbonate of copper was found, but a large proportion of the green ore was atacamite. Below this oxides of copper were met with, both red and black, then grey and black sulphides with iron pyrites. These deposits of ore were mostly exhausted many years ago. Chalcopyrite came in at varying depths of from ten to thirty fathoms, and this is almost the only kind of ore now being raised at the mine. It continues down to the bottom of the deepest shaft. The veinstone associated with the metallic minerals is composed of portion of the bedrock, iron pyrites, calcareous spar, &c. The country formation is schistose rock. The quantity of ore raised from the time the mine was opened to December 31st, 1886, was 451,016 tons of 21cwt., of the value of £2,030,143 in the colony. It yielded on the average about 10 per cent. of copper. Thirty shafts, including trial shafts, have been sunk, the deepest being 195 fathoms. The water level was reached at about 5 fathoms. The drives, levels, &c., including Matta and Kurilla, extend a distance of twenty miles. The yield now varies from half a ton to six tons per fathom.

**WANDILTA.**—This was a discovery following the finding of the lode in the Cornwall Mine. The prospectors sank to a depth of 30 fathoms, got a branch lode containing green carbonates and grey ore, and drove on it until it "gave out." The property was subsequently included in that known as the Wallaroo Company's.

**WARRAKIMBO MINE,** N.W. of Kanyaka.—No records obtainable.

**WARRIOOTA MINE** lies on the northern slope of a low range, about ten miles S.E. of the township of Beltana. The ore deposit is a lode 1ft. or 2ft. wide, which strikes E. 15° N.—very nearly coincident with the strike of the country—but dips irregularly through the latter, first for a few feet vertical in depth, and then at an angle of 70° northward. The hanging wall looks well defined, but the foot-wall seems irregular. Judging from the nature of the vein stuff left near the two deepest shafts, the general mineral character of the lode alters within a short distance. At the one shaft it is composed of a soft, somewhat calcareous, quartzose mullock, densely traversed by thin quartz veins. These enclose small nodular masses of earthy malachite, and occasionally of azurite, associated with calcite. A trial of some of the ore gave traces, though very faint, of bismuth. Specimens of veinstones left near the other shaft consist of a dense and hard ferruginous and highly quartzose striped matrix enclosing thin seams, and small druses of acicular crystals of malachite, besides veins of cupriferous gossan. In general these veinstones resemble the poorer surface stone of the Blinman Mine. No trace of sulphide ore could be detected. The country in the neighborhood of the workings looks undisturbed, and consists of alternating beds of thin cleavable slates and fine-grained, thin-bedded, partly micaceous, slaty sandstones. Strike E. 20° N., dips southward at an angle of about 35° some distance eastward of the workings near the line of the lode. Judging by the rather poor ore last raised, and left on the ground, the future prospects of the mine are not very favorable.

If gold crushing and saving machinery were at hand, the trial of a few tons of the lodestone for gold is to be recommended, and the prospecting for this metal generally in the gullies and in the quartz reefs in the neighborhood. In fact, a zone of country of considerable width exists in this neighborhood, which is traversed by strong promising-looking quartz reefs, and altogether presents an auriferous respect. (Ulrich, 1872.)

**WARBA WARBA COPPER MINING SYNDICATE.**—Three mineral claims situated near Mount Nor-West Station.



**WATTLE AND DAB.**—A prospecting venture near Kadina, which was unsuccessful. (1873.)

**WAUKALOO MINE**, seven miles north-east of the Boolcoomata Mine. No records obtainable.

**WEBB AND ROBERTSON'S MINE** is about one mile east of Nicholl's Knob, near Mount Lyndhurst. The lodes follow the strike and dip of the rocks, which are calcareous slates, much floored. They strike N. 20° W., and dip 67° E. 20° N. There are three lines of lodes, the one to the north has been prospected only; it consists of calcite and gossan, with grey ore and pyrites, about 8in. wide. The middle lode has been worked by a shaft 30ft. deep. It is 4ft. wide, but not well defined. (1884.)

**WELCOME MINE** is sixty-eight miles N.E. of the township of Beltana, and about eighteen miles S.E. of the Yudnamutana Mine. There are two small batches of workings on adjoining spurs, a higher and a lower one. The workings on the higher spur consist of an open trench 3ft. to 4ft. wide, and about 40ft. long, exposing a quartz reef of 1ft. or 2ft. in thickness. It strikes N. 32° E., and dips W. 32° N. at 62°. The underlay wall is well defined, and is composed of a gritty silicified sandstone, and boulder conglomerate. The enclosed boulders are mostly quartzite. The hanging wall is less regular, and is composed of fissile, rather concretionary slates. These appear to have been disturbed, as, on the top of the spur, they show a very flat dip of about 8° to 10° S.W., while further off they strike N. 30° W., and dip W. 30° S. at 20°. In the reef, and in a few feet of the hanging walls, are exposed solid patches and thick veins of ore, consisting of grey oxide, coated generally with green carbonate and chloride of copper. The ore-bearing part of the country does not seem to extend much beyond the trench on either side, for towards the south the ore patches disappear, and the veins split and thin out, and northward from the trench no ore is traceable for more than a few feet. In the second batch of workings the ore is of a similar character to that in the first batch. (Ulrich, 1872.) There is a strong lode of solid grey ore 2ft. wide, averaging 40 per cent. for copper; and in a hill south of this mine a series of lodes of varying thickness, which yield ore assaying up to a very high percentage. (A. Frost, 1890.)

**WEST DOORA.**—Situated between the Doora and Derrington mines, and a great deal of costeeing was done in search of the Doora lode. The claim was subsequently abandoned. (1874.)

**WEST KANMANTOO MINE.** (See KANMANTOO MINE WEST.)

**WHEAL ACRAMAN MINING COMPANY.**—This was situated ten miles E.N.E. of Adelaide, near the Montacute Mine. (1854.)

**WHEAL AUSTIN MINE** is half a mile S.S.W. of the Yudnamutana Mine. There is an immense reef of ironstone and gossan, containing strong stains of copper, and numerous stones of green carbonate and grey oxide. It is from 18ft. to 20ft. in width, and its course is very regular. (Austin, 1863.)

**WHEAL BARTON MINE**, near Angaston, was worked for a time and then closed, without results. (Austin, 1863.)

**WHEAL BESLEY MINE**, twelve miles N.E. of Sliding Rock Mine. There are two lodes on the section bearing very good gossan, impregnated with green and blue carbonates, and containing occasional good stones of ore. The lodes run north and south, and are traceable for a distance of 300 yards. Liver-colored and yellow ore is found scattered on the surface. (Austin, 1863.)

**WHEAL BLINMAN** is near the Blinman Mine. The lode runs nearly north and south, and is distinctly traceable for about 200 yards on the surface. It is backed by a reef of indurated clayslate, intermixed with ironstone and gossan. In the clayslate small pieces of green carbonate and grey ore are found. At the top of a hill the lode forms into a large "blow," in which the ore was discovered. On the rocks being broken away a fine lode of rich ore was seen, 8ft. wide, and underlying westward into the hill about 18in. in the fathom. Five shafts have been sunk on this lode, ranging in depth from 2 to 9 fathoms. Some rich green and blue carbonates were occasionally met with, and specks of the finest yellow ore. (Austin, 1863.)

**WHEAL BUTLER** lies about two miles N.E. of the Blinman. A good lode passes through the property, and this has been opened at intervals for nearly a quarter of a mile. It yields a peculiar reddish-brown or liver-colored ore, supposed to be merely a variety of ironstone, but which, on being assayed, produced 37 per cent. of copper. The back of the lode consists of ironstone, micaceous iron, gossan, and quartz; and, below these, stones of green and blue carbonate and a quantity of liver-colored ore are found. The underlay is about 3ft. in the fathom. (Austin, 1863.)

**WHEAL DEVON.**—A prospect near Kadina, commenced in search of the Kurilla lodes. There was a fair amount of costeeining, and a downright shaft was sunk about 10 fathoms; also a little driving was done, but with poor results. The venture was then abandoned. (1874.)

**WHEAL FORTUNE MINE** is situated on land leased from the Paringa Mining Company (1850), in the Mount Barker district. It has yielded black oxide and other ores.

**WHEAL FRIENDSHIP MINE**, established 1850. A lease from the Britannia Mining Company. The venture stopped working in 1851. No records.

**WHEAL FROST MINE** is close to the Yudnamutana Mine, and consists of a small conical mountain of greenstone, thickly impregnated with green carbonate and red oxide of copper. Geologically considered the belt of range country stretching from west of the Yudnamutana mines towards the Freeling heights has every prospect of containing copper ore deposits and, perhaps, gold. (Ulrich, 1872.)

**WHEAL GLEESON** is one of the Yudnamutana mines. There are three shafts. The lode strikes irregularly north and south, with a dip steeply eastward. It is apparently from 1ft. to 3ft. in thickness only, and consists, near the surface, of rubbly slate, mullock full of veins and irregular masses of brown and micaceous iron ore, enclosing seams, solid patches, and coatings of earthy malachite. (Ulrich, 1872.)

**WHEAL GOYDER.**—This venture was situated near to the Paramatta Mine, and has long since stopped working. (About 1874.)

**WHEAL HANCOCK MINE** is adjacent to the Welcome Mine. There is a good lode distinctly traceable for about 250 yards. It is about 18in. wide, and consists of fine grey oxide. There are veins and stains of ore, with small pieces of malachite scattered on the surface near the lode, which runs N.E. and S.W., underlying westward into the hill. (Austin, 1863.)

**WHEAL HARMONY**, twenty-fives miles east of Adelaide. No records obtainable.

**WHEAL HUGHES MINE.**—This property is situated not more than a mile distant on the northern side of Moonta, and north-west of Moonta Mines. In the outset the discoverers obtained good deposits of yellow ore coated black. This cut out, and a good deal of money was spent in further search. The mine then lay idle for a

number of years, but recently an effort has been made to re-work the property, which is believed to contain valuable lodes.

**WHEAL HUMBY MINE** is four miles S.W. of Moonta, Yorke Peninsula. Indications, similar to those at the Moonta, led to sinking to a depth of 4 fathoms, when the back of a load was cut, consisting of ironstone mixed with green carbonate of copper. (Austin, 1863.)

**WHEAL JAMES.**—This mine, adjacent to the Wheal Hughes, was discovered prior to, and led to, the finding of the Paramatta, and at one time a great deal of exploratory work was done. The quantity of ore raised was not remunerative, and operations ceased. A good opinion is still held respecting this venture, though it has not been worked for many years.

**WHEAL MARIA.**—This mine is situated eighteen miles S.E. from Adelaide. It was opened as a copper mine about the year 1850; but, owing to its not being immediately productive and for want of capital, it was abandoned. About the year 1886 it was re-opened as a silver-lead mine. (See **ALMANDA**, under **SILVER-LEAD**.)

**WHEAL MARY MINE**, twenty-five miles E.S.E. of Adelaide. No records obtainable. (Period, 1864.)

**WHEAL MOLD.**—A speculative venture, situated N.E. of the Mattapara, taken up in the expectation of discovering a continuation of the Mattapara lode, and abandoned some years ago. (1874.)

**WHEAL NITSCHKE.**—(See **NITSCHKE**.)

**WHEAL PROSPER.**—A lease from the Britannia Mining Company. No record.

**WHEAL SARAH** is in the neighborhood of the Bundaleer station, near Clare. There are three east and west lodes, with a dip of 75°. They have been worked a few feet only. The ores are micaceous iron mixed with green carbonates and sulphurets. The country is hard siliceous white and brown rock with bands of grey arenaceous slates and brown sandstone, with a dip W. 85° to 90°. (Selwyn, 1859.)

**WHEAL STUART MINE** is about three and a half miles S.S.E. of the Moonta. A quantity of green carbonate ore was found on the surface. A shaft has been sunk for eight and a half fathoms, through gossan, steatite, ironstone, and quartz. (Austin, 1863.)

**WHEAL SUSAN MINE** is on the eastern plain, near Parallana. There is a strong lode of ironstone running above the surface for 50 or 60 yards, and containing grey copper ore and green carbonate. There is also a good crosscourse running into the lode. (Austin, 1863.)

**WHEAL TURNER.**—This mine, which is situated on the Umberatana sheep-run, sixty miles north-east of Farina, was examined by the Inspector of Mines in October 1889. The property consists of six claims, 480 acres. A bold hill of quartzose rock, rising abruptly from a creek 400ft., shows several copper-bearing lodes\* running northerly and easterly. In No. 1 shaft (50ft.) a large lode of excellent copper is disclosed, and No. 2 (16ft.) shows kindly formation, good walls, and a fair percentage of copper in rich veins. Other good prospects on the property have not been opened up much, but prove that there is a large extent of cupriferous country. The difficulty in working this mine is its distance from a railway, so that the ores will require dressing to a high percentage for transit. The mine has a very promising

outlook. Mr. Barrett, the secretary furnishes (April, 1890) the following particulars:—

There are eight lodes upon the property, varying in width from 4ft. to 20ft., and four shafts have been sunk, following the dip of the lode, the greatest depth reached being 54ft. The ore consists of green carbonate, azurite, copper glance, grey ore, and red oxide, the matrix being quartz and iron, and the country is sandstone and clay slate. The bulk average assay shows 25 per cent. copper, from hand-dressed ore; and the mine, which has a satisfactory prospect, is as yet only in its infancy.

**WHEAL WILLIAM and WHEAL ALFRED.**—These mines are ten miles east and S.E. from Keyneton, fifty-nine miles N.E. of Adelaide. No records of work done are obtainable.

**WHYTE PARK MINE.**—Locality, Forest Reserve, Wirrabara. Prospecting has been done by means of three shafts, two winzes, and two drives. Copper ore of poor quality has been found, in conjunction with calcite. Quite as much testing has been done as the indications and locality warrant. (Inspector of Mines.)

**WILKAWAT MINE.**—(See NALYAPPA.)

**WILLOURAN MINE** is fourteen miles S.W. of Hergott, and about five miles north of Willouran Hill. This mine was opened about the year 1880, and 100 tons of copper ore were raised and sent away, the average produce being 24 per cent. of fine copper. The ore is very ferruginous, and is combined with oxides and oxychlorides of copper. The lode is traceable along the range for a distance of four miles, and ore has been found, with a few slight breaks, for several miles further. A shaft was sunk to a depth of 50ft., and a drive was put in for about 100ft. on the course of the lode. Nodules, apparently of iron, are found on the surface, but, when broken, the iron is found to be but a thin coating, the bulk of the stone being grey oxide of copper of 35 or 40 per cent. The district further north, beyond the "Dome," contains other rich deposits of copper. (Austin.)

**WILLOW COPPER MINING SYNDICATE.**—Six mineral blocks containing altogether 480 acres, at Cradock, hundred of Yednalue. No records.

**WILLOW CREEK MINE.**—This is situated north of the Napoleon Mine. No records obtainable.

**WIPERAMINGA MINE,** near Boolcoomata, forty-three miles north-east of Manna-hill. Two or three shafts and open cuttings have been made on quartzite reefs, stained with blue and green carbonate of copper. The quartzite and micaceous schists and slates are penetrated by coarse granite dykes. This mine has been abandoned for some time, and, as far as can be judged, no defined lode has been found. (1885.)

**WINDITTIE MINE.** (See ARNO BAY.)

**WIRTAWEENA MINE.**—No records obtainable.

**WIRRAULTEE MINE.**—No records obtainable.

**WIRRAWILKA MINE** is situated fourteen miles east of the township of Hawker, and about two miles north of Mount Plantaganet. The rocks of the country seem principally to consist of metamorphic slates and limestone. Some irregular workings in the limestone appear, from specimens left on the ground, to have yielded some very good ore, grey oxide of copper enclosed in concretionary masses of green carbonate. The ore appears to occur in pockets, as there is no evidence of a lode crossing the limestone. The limestone is hard, sometimes coarsely crystalline, and is coated with green carbonate, and shows abundant joints and crevices. Another batch of workings consists of one deep and four shallow shafts, sunk in line, over a length of three chains. The

ore deposit here is a contact lode, bearing a great resemblance to that of the Yudnamutana Mine. It runs at a strike of N. 150° E., with apparently a steep westerly dip, within the boundary of a strong dyke of diorite greenstone and chloritic and micaceous slates; these near the surface are very soft and friable. The copper ore raised appears to have been green carbonate, rarely associated with grey oxide of copper. From ma-ses lying near the shafts, it would seem as if micaceous iron ore, calcite, and lode slate were the nearly exclusive occupants of the lode fissure, and that the copper ore occurred very sparingly through them. A mineral, abundant in the spoil heap of the deepest shaft, of lavender-blue color, and fibrous texture, proved to be the rare species crocidolite or blue asbestos. (Ulrich, 1872.)

**WOMBAT.**—A discovery near Kadina, which was subsequently incorporated with the Wallaroo Mine. (See HOME MINE.)

**WOODLOOMOOKA.**—In the neighborhood of Mount Jacob, sixty-four miles east of Leigh's Creek railway station, a lode of copper ore has been traced and prospected for some distance by holes from 10ft. to 15ft. deep. The lode formation is from 3ft. to 4ft. thick, and rich veins of copper glance have been exposed. Two miles northwards several shallow pits have been sunk. In one of these, at a depth of 8ft. or 10ft. in a well-defined lode formation, a vein of rich copper ore is exposed, which is worth sinking on. (1884-5.)

**WOODNAMOOKA.**—The Inspector of Mines says this is one of a series of mineral claims in the neighborhood of Wootana Station, showing a bold outcrop carrying low-grade copper. It is such a show as may be frequently met with in the Flinders Range, but the prospect is not sufficiently encouraging to warrant further outlay. (1889.)

**WORTHING MINE** is near Morphett Vale, sixteen miles south of Adelaide. This mine has been abandoned for many years, owing to the hardness of the ground and to the ore not having been found in paying quantities. The lode strikes E. and W., and contains quartz, iron, and copper pyrites. The rocks are clayslate. There are several shafts, and the pumps are still in the mine.

**WYAKA MINE** is 210 miles north of Adelaide and about eight miles S.W. of the Blinman Mine. It has long been abandoned. (Worked until 1867.)

**YALPOODNIE MINE** is in the neighborhood of Franklin Harbor. One shaft was sunk to about 20 fathoms, but no work has been done upon the mine for the last twenty years.

**YATTAGOLINGA COPPER AND LEAD MINE.**—Lodes in a cliff at Rapid Bay, 3ft. to 6ft. in width. About 10 tons of ore raised per month. (Dutton, 1846.) [See also under "SILVER," Phillips's mine.]

**YEDLA MINE** is one of the Yudnamutana mines. A fine regular lode is visible for nearly 300 yards, running S.E. by E. There are also two secondary lodes running parallel to the main lode.

**YELTA MINE.**—Formerly worked with success for some years, and at present comprised in the Moonta mines properties.

**YOOTOOMOOKINA MINE**, sixteen miles east of Blinman, has a north and south lode of copper traceable for nearly one mile. It is about 5ft. wide, carrying good ore 15in. thick. The underlay is about 1ft. in the fathom west. (Austin, 1863.)

**YORKE PENINSULA CONSOLS.**—Prospecting claims on four sections adjoining the the Vulcan Mine, about six miles S.E. of the Wallaroo Mine. (1873.)

YUDNAMUTANA MINES are situated about 168 miles N.E. of Port Augusta, and about sixty miles S.E. of Farina. A feature of great geological interest in this district is the presence of an intrusive rock—a peculiar kind of greenstone—with metamorphic concomitants of great variety of texture and mineral character. The chief and most developed ore deposit is a so-called “contact lode.” It runs within the boundary of the intrusive rock on the east, and the accompanying metamorphic schists on the west, lying in places between the two, or traversing one, sometimes the other, rock in its course. Its mean strike is N.  $10^{\circ}$  W., and its dip eastward at  $70^{\circ}$  to  $80^{\circ}$ ; whilst the metamorphic rocks adjoining strike N.  $40^{\circ}$  to  $45^{\circ}$  W., and dip south-westerly at  $60^{\circ}$  to  $70^{\circ}$ . The lode seems to have varied from 2ft. to 15ft. in thickness, and has been traced southward, from the top of the hill, to close upon twenty chains in length. At the furthest point south a vertical shaft has been sunk about 50ft. deep. The ore produced from this was very poor, consisting of brown jaspery quartz, full of veins and patches of micaceous iron and ochrey-brown iron ore, with many scattered green stains and coatings in hollows and joints. Nine chains northward from this shaft is a whim shaft sunk beneath the water level. Ore raised from this shows for the greater part a kind of breccia, composed of brown, jaspery-looking, ferruginous limestone, brown iron ore, and chrysocolla, associated with malachite and occasionally azurite. Of sulphide ore no traces were observable. Besides fine pieces of malachite and chrysocolla there were some smaller ones of reddish grey oxide, which would indicate that the ore from this portion of the lode was of very good quality. From an excavation on top of the hill a large quantity of rich ore—silicate, carbonates, and oxides of copper—was obtained. The western wall of this pit consists of metamorphic slates striking N.W. and dipping S.W. at  $65^{\circ}$ ; the eastern one of massive greenstone, showing here and there small protruding bosses of a syenitic character. The lode shows in the northern face of the pit, but is thin and apparently very poor, and continues so on the surface. In open workings and in a tunnel close by the ore was of a similar character. Judging from the appearance of the district, there is no reason why gold should not exist and be found, both in the reefs and the creeks, if properly prospected for. (Ulrich, 1872.) [See under “GOLD.”]

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## SILVER-LEAD.

**ACLARE MINE** is situated on section 1296, in the hundreds of Kanmantoo and Strathalbyn, and is close to the village of St. Ives, and three miles from Callington railway station. The property comprises 269 acres of mineral freehold, and is watered by the Mount Barker and Nairne creeks. There are nine lodes disclosed in this mine at the present time bearing N. 10° E., with an easterly underlay of 2½ ft. in the fathom; their width varying from 1 ft. to 36 ft. On the surface the ore consists of carbonate of lead and at depth carries gold, silver, nickel, lead, zinc, antimony, iron, and sulphur; and to a depth of 25 ft. the carbonate yields 50 per cent. of lead and 90 ozs. of silver to the ton. Some recent shipments of ore sent to Europe averaged 52 ozs. silver; and the average percentage of the ore is, from near the surface, lead, 50 per cent., silver, 90 ozs.; from 30 ft. to 114 ft., a little lead, about 40 per cent. of zinc, and silver varying from 60 ozs. to 302 ozs. The veinstone associated with the metallic minerals is principally silica. The value of the ore is variable, but some has realised £19 per ton in London. The ore occurs in shoots of carbonates or sulphides, striking southerly at an angle of 30° east. There are five shafts on the main workings, the deepest of which is 30 fathoms, or 180 ft. Seven drives have been put in to the following distances:—52 fathoms, 35 fathoms, 30 fathoms, 16 fathoms, 11 fathoms, 6 fathoms, and 3 fathoms, a total of 153 fathoms, or 918 ft. Besides the main workings an adit has been driven for 312 ft. to cut the main lode, but no ore was obtained. Other adits have been driven and shafts sunk, but nothing payable has been met with outside the main workings. This mine was the property of and worked for years by Mr. F. C. Singleton, who furnished, in 1887, the foregoing information. The Inspector of Mines reporting upon this mine last year, when it was lying idle, said that the surface portion has not suffered much decomposition, so that carbonate and oxide ores are scarce, and sulphides are found very near the surface. It is a true fissure vein, and increases gradually in width downwards. In the west end of the 120 ft. level there is a solid body of ore 7 ft. wide, whilst the foot and hanging wall workings show the foundation to be very much wider. Two or three other of the five shafts all disclose the permanency of the lode, and its uniform ore-bearing character. The ore in its present state would be refractory, but the zinc would pay well for extraction. At a subsequent visit, as stated by the Inspector, 1 cwt. of samples taken from across the face of the lode at the 120 ft. level returned 6 per cent. of lead, 35 per cent. of zinc, and 32 ozs. 13 dwts. 8 grs. silver per ton. That gentleman expresses his conviction that the Aclare Mine is undoubtedly a good one, and since the resumption of working an important improvement, greatly enhancing the value of the property, has occurred. A formation 8 ft. wide of carbonate ore has been discovered in the hanging wall, which gave on assay 10 per cent. of lead, 58 ozs. silver, and 1 oz. 13 dwts. of gold per ton, with only a trace of zinc; the whole bulk would probably average 50 ozs. per ton. Active work is being carried on at the mine, and other prospects are being opened in the district. The Aclare Mine has become the property of the Kangarilla company, a proprietary formed in England.

**ACLARE NORTH MINE.**—This property adjoins the Aclare Mine, and a good deal of work has been done in sinking trial shafts and driving a tunnel on the course of a not very productive lode outcropping in a hill by the side of a creek. Capt. Deeble regards this as a promising prospect.

**ADELAIDE BELTANA BLOCKS SILVER MINING SYNDICATE.**—Area and locality of property: eight mineral claims containing each 80 acres, immediately north of and adjoining Beltana North and Winnowie Consolidated, and about five chains from the Ediacara claims, near Beltana.

## ALBERT MINE.—(See PRINCE ALBERT.)

ALMANDA MINE is situated about eighteen miles S.E. from Adelaide. In 1850 it was opened and worked as a copper mine, but was not productive at a shallow depth, and, the capital of the company not being large, work ceased. In 1866 the mine was examined, and from assays made of some stones left on the surface it was found to be poor in copper but rich in silver. Seven samples assayed gave from 44ozs. to 115ozs. of silver to the ton of ore; five other samples yielded from 25ozs. to 75ozs. of silver to the ton; and three samples assayed elsewhere gave from 30ozs. to 75ozs. of silver per ton. In May, 1868, a mineral claim (No. 2759) was taken out by a few persons, and in June 4 tons 8cwt. of ore, crushed in a Chilian mill, yielded about 28ozs. silver to the ton. Later on amalgamating pans were tried, and by this process some 6,000ozs. of silver were produced. In 1870 fresh assays from various parts of the mine were made, and yielded results of from 57ozs. to 66ozs. silver to the ton, and about 5 per cent. of copper. At a depth of 16 fathoms in the engine shaft, the lode assumed a hard character and contained barytes, quartz, silver ore, arsenic, &c. In 1877 the engine shaft was sunk to a depth of 21 fathoms, and assays from stone raised gave—silver, from 88ozs. to 163ozs. per ton; gold, from 1oz. 13dwts. per ton; copper, from  $7\frac{1}{2}$  per cent. to 16 per cent.: and from the western drive, off the engine shaft, 40ozs. of silver to the ton,  $4\frac{1}{2}$  per cent. of copper. In 1881 the winze in Ey's tunnel was sunk to a depth of 76 fathoms, but the water came in too strongly to be kept under by hand labor. Assays gave 17ozs. silver to the ton, and 16dwts. 8grs. of gold. The workings consist of two shafts of 21 and 16 fathoms, and a winze in Ey's tunnel, sunk to a depth of 76 fathoms. There are also two tunnels of 40 fathoms and 20 fathoms each, a dam, various buildings, and a furnace. The mine is not now being worked.

AVONDALE SILVER-LEAD MINE is situated about two miles S.W. of Mount Lyndhurst, and fifteen miles from the railway station. There are five mineral sections of 80 acres each, and four or more well-defined parallel lodes of almost pure galena, without any vein stuff, traversing the strike at right angles, of jointed and cloven beds of quartzite, argillaceous slaty shale and schist. Only two have been worked. The lodes vary in width from a few inches to over 2ft. (later reports give the width of 3ft. to 5ft.); they strike north and south (magnetic) with a high westerly dip. A shaft has been sunk to a depth of 100ft., and the galena is still visible in quantity, both in the shaft and in the outcroppings along the surface. Assays of five samples of ore from this mine were some time ago made by Mr. G. Goyder, jun., and the results were as follows:—

No. 1	.....	77 per cent. lead, and 5 oz. 14dwt. 8gr. silver per ton.
No. 2	.....	73 per cent. lead, and 4oz. 18dwt. silver per ton.
No. 3	(gossan).	21 per cent. lead, and 7oz. 7dwt. silver per ton.
No. 4	.....	67 per cent. lead, and 4oz. 14dwt. 7gr. silver per ton.
No. 5	.....	72 per cent. lead, and 8oz. 1gr. silver per ton.

This mine is not at present being worked. The ore is easily raised, and a large quantity was sent to London, but the results were not considered payable. T. A. Masey, Esq., has (1890) furnished the following particulars:—Several hundred tons of galena, assaying from 50 to 75 per cent. of lead and from 9oz. to 12oz. or 15oz. of silver to the ton, have been raised. The mine was worked some time back, and presumably profitably, and has now again been taken up with the view of being vigorously developed, as the ore could be sold at a profit as a flux to the smelting works. Several tons of ore are being forwarded to England for treatment under a new alkaline reduction process. The ore showing in one of the lodes at about 15ft. from the surface would yield four tons of 75 per cent. galena to the fathom, and requires very little dressing.

BARATTA MINE.—This property is situated near the Baratta Springs, about ten miles west of Eukaby. At the time of the Government Geologist's examination (1888) a



shaft was being sunk to prospect an outcrop of brown iron ore and ferruginous strata near the junction of a mass of crystalline limestone with kaolinized slates. Samples of the surface ore were said to have yielded good silver assays. He was of opinion, from the nature of the outcrop, that a lode containing silver was not likely to be found. At a later period the Inspector of Mines reported that there were several iron "blows" at the foot of a big hill, improperly supposed to be the outcrop of a lode. Two shafts had been sunk, and a crosscut put in, but nothing of value was found. The further expenditure of capital in mining upon this place, he said, would be sheer waste. (1889.)

**BARRITT'S MINE** is situated about a mile and a half north of Normanville and forty-eight miles south of Adelaide. The lode ran east and west, and was about 12 in. wide; underlay north, and about 3 ft. in 40 ft. The silver-lead was in yellowish clay, and the ore contained about 60 per cent. of lead, and from 3 oz. to 5 oz. of silver to the ton. About twenty-five tons of ore were raised when first the mine was worked. It has been worked of late years by various people, but we have no available record of results. The ore was valued at £10 per ton in London, but the buyers complained of the way in which it had been dressed. One shaft was put down to a depth of 70 ft., but the water level was not reached. A drive of about eight fathoms was put in. The ore occurred in blocks of almost pure galena, weighing as much as two hundredweight each, also in large crevices and in loose rocks. The lode ran from the surface to the bottom of the shaft. (1887.)

**BASHAM'S PROSPECT.**—An iron "blow" outcropping through the alluvial on Basham's property close to Port Elliot, formerly quarried for road metal, showed silver and copper. The Inspector of Mines expresses the opinion that the junction of the granite with the clayslate being a favoring circumstance, there is encouragement to prospect the locality. Assays of samples he took from the ground gave 4 oz. 9 dwt. of silver to the ton. (1889.)

**BELVIDERE**—(See COPPER.)

**BELTANA BROKEN HILL.**—This mine is situated near Randell's Lookout, near Beltana. The workings at the time of the visit of the Government Geologist (April, 1888) included a tunnel driven 60 ft. through kaolinized slate and sandstone. There was no lode visible, but segregations of ore were found embedded in the rock. There was an outcrop containing gypsum and manganese, and iron "blows" occurred in the same class of rock. Though a lode had not been found, yet larger deposits may occur and may furnish means of discovering one. Two average samples taken from the tunnel yielded silver to the extent of 2 ozs. 18 dwts. 19 grs. per ton, with 41 and 32½ per cent. of lead; and a sample procured by the manager gave 3 ozs. 15 dwts. 3 grs. of silver per ton and 47 per cent. of lead, with a trace of gold. Previous to this there was a report of the existence of a lode 60 ft. wide, the ore from which had given high assays, but this report was not verified when the mine was worked, neither was rich ore discovered.

**BELTANA COMSTOCK SILVER-LEAD MINING COMPANY.**—Locality, Mount Serle Run, near Beltana; area, 200 acres. On the surface there is an outcrop of galena, and there are other galena lodes in the locality.

**BELTANA EDITH.**—Four mineral claims, four and a half miles west of Beltana township. Shafts were sunk in soft slates and sandstones near an iron outcrop, and near an old shaft showing stains of copper ore. No records.

**BELTANA KING.**—Mineral claim 10927, south of Beltana Broken Hill claims. No information received.

**BELTANA NORTH.**—At the time of the visit of the Government Geologist, in April, 1888, costeening was being done to a small extent in hard crystalline limestone, in which a few specks of galena were occasionally seen. At a more recent period the Inspector of Mines examined the property, and found that an endeavor was being made to cut the Ediacara lode, and he was of opinion that the vertical shaft put down must have passed through it and into the footwall. The course of the lode is W. 10° S., and the dip S. 20° E. He considered that the prospects of the Ediacara Mine justified prospecting on this property. (1889.)

**BELTANA SOUTH SILVER MINING COMPANY.**—Two mineral leases, 10925 and 10926, 106 acres, adjoining the above. No records.

**BELTANA WHEAL TERRELL MINING SYNDICATE.**—Three mineral claims, comprising 240 acres, near Beltana. No records.

**BELTANA WINNOWIE SILVER MINING COMPANY.**—Two mineral claims east of and adjoining the Beltana Broken Hill property. No records.

**BEN LOMOND MINE.**—This mine was known as Chambers' Mine. No records obtainable. (See also GOLD.)

**BLACK HILLS PROPRIETARY SILVER MINING COMPANY.**—Locality, sixteen miles south-east of Koorunga. No information received.

**BIG HILL.**—This mine is situated two and a half miles from the Great Gladstone Mine, and contains a lode of brecciated gossan and iron ore of considerable width, cutting across horizontal clay and calcareous slates. The prospectors reported good assay results, but neither silver nor gold were found in the samples tested by the Government Geologist. (1888.)

**BUGLE RANGES,** five miles east of Macclesfield and six miles south of Mount Barker. A mine in the neighborhood has been found to yield silver, but not to any great extent. Very little work has been done upon it. (1887.)

**BUTTA-MUK MINE.**—This claim, eighty acres, held under mineral licence in the hundred of Coglin, has a strong iron lode in a creek, carrying oxide of iron and large bunches of micaceous iron, from which encouraging assays for silver are said to have been obtained. To prove the lode in settled country a shaft 105ft. deep has been sunk, and from the bottom a drive west 26ft. has passed through the footwall of the lode, which runs north-east and south-west, underlying south-east. The country is decomposed, and further sinking is required to prove the value of the sulphides. There is also another iron oxide lode in the property, carrying a small percentage of mundic. Government assay of samples taken showed in silicious iron-stone 4grs. gold to the ton, and from ferruginous quartz 3dwt. of gold to the ton. Further sinking necessary. (Inspector of Mines, 1889.)

**CAMPBELL'S CREEK MINES** are about two miles east from Cape Jervis. Lead has been found on the property, but no payable lode has yet been cut. The ore found was good, but was not in payable quantities. (Austin, 1863.) It has recently become a part of the Talisker property. (See TALISKER.)

**CAMPBELL SILVER PROPRIETARY COMPANY.** — Area and locality, 640 acres situated at Bundaleer.

**CARRIETON, EURELIA, ORROROO, BLACK ROCK, COOMOOROO, WALLOWAY, MCGEE SPRINGS, MCCULLOCH, EURLIPA.**—Several localities near these townships were inspected by the Government Geologist in July, 1886, where shallow shafts had

been sunk on supposed silver lodes. Assays from some of these places are stated to have yielded from 40zs. to 240zs. of silver to the ton. After examination of the supposed ores, however, he was forced to conclude that the rich samples of ore sent down from the mines for assay were not taken from the places they were supposed to come from; or, if so taken, were enriched by the addition of silver ore or silver. No permanent, continuous, well-defined lode was seen at any of the claims. In some instances the supposed lodes consisted of bed rock alone.

**CENTENNIAL SILVER MINING COMPANY.**—Area and locality, four mineral claims situate at Trebilcock's Gap, four miles west of Beltana railway station. It is stated that silver, copper, and gold have been found on the property.

**CHAMBERS' MINE** (see BEN LOMOND).—Locality, ten miles south of Adelaide. No records obtainable.

**CLARENDON.**—Some years ago a mine was opened here. There is a brown iron ore lode dipping S.E. A shaft 40ft. deep has been sunk in clay slate, and there are several other holes sunk along the cap of the lode. No records obtainable.

**COCKSCOMB WEST SILVER MINING COMPANY.**—Twelve mineral blocks, containing 960 acres, in the Cockscomb Paddock, Oulnina Run, about six miles from Winninnie Railway Station. No records.

**COPPERALINKA SILVER MINING SYNDICATE.**—Area and locality, two mineral sections 14171 and 14172, 160 acres, sixteen miles east of the Mannahill railway station.

**CUMANILLA OF CHERRY GARDENS MINE** is about twelve miles south of Adelaide. A shaft was sunk about 13 fathoms deep, and the ore raised is said to have contained a good percentage of silver and lead. (1887.)

**DALHOUSIE SYNDICATE.**—Situation of property, Golden Gully, ten miles north of Petersburg. Rock formation, blue limestone, slate, and sandstone, traversed in places by thin veins of calcite, containing galena and gossan. These have been prospected by shafts and cuttings, which have failed to trace these veins to any lode formation. (1887.)

**DALKEY HILL MINE.**—Situation five miles south of Premier Mine, in the New Luxemburg district. The Inspector of Mines who has examined and reported, states that two vertical shafts to strike the lode at a shallow depth were being sunk. The ground is of a favorable character for carrying plumberiferous lodes, but the surface exhibits contortions making it impossible to determine the general strike or dip of the country rock. The formation carries galena, and partly decomposed sulphide ore, encased in calcareous matter; the balance of the gangue consists of quartzite, schist, and silicious ironstone. The ore appears to make in bunches, and dips south. Samples taken assayed 60 per cent. lead, and 210zs. silver to the ton. This is a venture that should be prospected very carefully and completely. (1889.)

**DARK HILL MINE** (See ALBERT).—Locality, two miles south-east of Giles's Knob, Oulnina Run. Here there are several quartz reefs and veins, with galena, carbonate of lead, and gossan. Some of these contain but a small percentage of silver-lead; others offer sufficient inducement to cause a thorough prospecting of the locality, as the lodes are wide and well defined and worth a trial. The rock formations consist of micaceous clay slates, calcareous slates, and micaceous schist, with dykes of eruptive granite. Three samples taken, assayed as follows:—(1) carbonate of lead, 19oz. 4dwt. silver per ton, and 66 per cent. of lead; (2) galena, 37oz. 18dwt. silver per ton, and 72 per cent. of lead; (3) carbonate of

lead, 4oz. 6dwts. silver per ton. On the occasion of a recent visit (1890) the Inspector of Mines arrived at the conclusion that the mine did not present aspects warranting further outlay. Recently it has been amalgamated with the Albert Silver Mine.

**DARK HILL PROPRIETARY SILVER MINING SYNDICATE.**—Eight mineral claims, 640 acres, thirty-five miles east of Mannahill railway station, and on the road known as the Peg Line Track. No records.

**DR. DIXON'S PROSPECTING CLAIMS.**—Locality, two miles westward of Taltabooka Well. Prospecting is being carried on here on galena veins, associated with quartz reefs. A sample of the galena assayed 17ozs. 6dwts. of silver and 62 per cent. of lead.

**DOIG'S CLAIMS.**—Locality, twelve miles west of Beltana, near Winnowie, and east and adjoining Beltana Broken Hill. Carbonates and other copper ores have been found, but not in payable quantities. (1888.)

**EAGLE SILVER-LEAD MINE.**—The report of the Inspector of Mines states that he visited the property, which is situated on the main South-eastern-road not far from Glen Osmond, in June, 1889. The course of the lode is due east and west, with a northern underlie, with smooth and regular walls averaging 4ft. apart. A great deal of work has been done on the property in sinking shafts and tunnels, and one of the latter will have 380ft. of backs when it reaches the shaft towards which it is being driven. Ore sold has averaged  $47\frac{1}{2}$  per cent. of lead and 10ozs. 5dwts. of silver per ton. Individual assays range higher, and the pyrites also carry gold. The prospects should encourage the shareholders. Mr. R. W. Kingsborough, the secretary, supplies the following information:—

The Eagle Mine is on section 1003, hundred of Adelaide, containing seventy-seven acres, held under rent and royalty. There are two lodes, ranging up to 6ft. wide, and two shafts, the deepest 115ft., and a winze 92ft., all following the dip of the lode, and 842ft. of drives. The ore is a sulphide, carried in a gossany matrix, and the country is a clay slate. The bulk assays have been  $54\frac{1}{2}$ ,  $59\frac{1}{2}$ ,  $61\frac{1}{2}$ , and  $63\frac{1}{2}$  per cent. for lead, and 7oz. 12dwts. 16gr., 11oz. 12dwts. 12gr., 12oz., and 10oz. silver per ton. The Inspector of Mines visited the property in April, 1890, and reported favorably of the prospects of the mine.

**EDGAR GILES' MINING AND PROSPECTING COMPANY.**—Nineteen mineral claims, 1,520 acres, north-east, and one of eighty acres near Anabama Station, on which it is said silver, lead, gold, copper, and antimony, have been discovered.

**EDIACARA BLOCKS.**—At the time of the Government Geologist's visit in April, 1888, costeening was being carried on at three places on this property. Galena is disseminated through a bed of crystalline limestone from 1ft. to 2ft. thick, inclining at a low angle eastward. Another excavation further south shows a similar deposit with a lower percentage of galena. The main workings are in a creek still further south. An average sample of the ore yielded on assay 48oz. 10dwts. 4grs. of silver per ton, and  $62\frac{1}{2}$  per cent. of lead. It is possible that large deposits of ore in patches may exist, but from the nature of the bed rock their locality and extent will be uncertain. The limestone should be sunk through into the underlying shales to see whether or not the ore continues from one rock formation into the other.

**EDIACARA MINE.**—The company hold mineral blocks containing altogether 600 acres, eighteen miles west of Beltana railway station. The general prospects of this enterprise justify, in the opinion of the Inspector of Mines, the employment of a number of men to open the bodies of ore. The bulk of the ore in sight requires dressing machinery. Samples assayed by the Government Assayer gave per ton—(1) galena, 42 per cent. lead and 7oz. 10dwts. silver; (2) galena, 52 per cent. lead and 39oz. 4dwts. silver; (3) glance, 16 per cent. copper and 342oz. silver; (4) galena, 51 per cent. lead and 10oz. 2dwts. silver; (5) galena, 52 per cent. and 2oz. 9dwts. silver; (6) galena, 63 per cent. and 17oz. 6dwts.; (7) galena, 52 per cent. and 18oz.

9dwt. silver. Taking the whole of the exposed bodies of ore, the average bulk would assay 16 per cent. lead and 4 oz. silver to the ton. The ore is in veins lying in the laminations of the strata; in the north quarry the formation is 3ft. thick, of which 18in. is galena ore, and it dips at an angle of 15°. The copper and silver glance forms not more than 1 per cent. of the bulk of the ore, and it is found in small and irregular bunches here and there along the surface. On a subsequent examination (in 1889) the same official reported that the general prospects of the mine had greatly improved, and that in the west shaft at the depth of 50ft. from the surface driving had been commenced, and the lode exposed consists of carbonate of lead, argenterous gossan, and calcite, and occasionally pieces of galena. In the north shaft or quarry the ore has increased in size, being now 2½ft., and carrying lead throughout. This deposit appears to be making a series of "wallows," the flat portion making ore, whilst in the vertical downthrow the ore is scarce. The prospects of the mine are much brighter, but it will not be brought into a payable condition until the ground is proved systematically. Mr. Dalton, the secretary to the company, informs us that, since this report was written, the west (Rosewarne's) shaft has been taken a further depth of 50 feet and that chlorides have been found in small quantity. The north shaft is now called Greenwood's shaft, and here driving and stoping are being carried on. There is lying at grass ore, estimated at 600 to 800 tons, suitable for concentration, that it is thought will dress up to 25 to 30 ozs. silver per ton, and 55 to 60 per cent. lead. Actual results by hand-jigging give 28ozs. silver per ton, and 56 per cent. lead.

**EMILY.**—A prospect near Big Hill. Galena occurs here in a brecciated limestone with gossan, striking north and south through slates and limestone. A sample of the ore yielded on assay 12oz. 18dwt. 1gr. of silver to the ton and 32 per cent. of lead. The gossan gave no result. The place is worth further trial.

**EUKABY.**—Forty-eight miles east of Hawker a discovery of silver-lead was made two or three years ago by Dr. Stephens, at Eukaby Hill, on his sheep run. Assays made for him by Mr. G. Goyder, jun., gave the following results:—

	Lead.		Silver, per ton. ozs. dwts. grs.		Gold, per ton. ozs. dwts. grs.
Galena yielded .....	60 per cent.	..	78 5 0	..	0 0 14
" .....	31½	"	15 17 0	..	0 0 22
" .....	44	"	15 4 0	..	0 0 6
" .....	70	"	77 1 0	..	1 14 16
" .....	62	"	35 8 0	..	0 4 14
Iron ochre and cerussite	—	..	0 3 6	..	0 3 2
Lead ore (black) .....	61½ per cent.	..	26 9 0	..	0 4 14
Ironstone and quartz ..	—	..	0 19 0	..	trace
Granular lead ore .....	46½ per cent.	..	2 16 0	..	0 15 13

At a subsequent period, the mineral deposits being extensive, several companies were formed under names given below. The general strike of the lodes is north-east, and they are more or less vertical, and well defined.

**EUKABY BLOCKS.**—This area of mineralized country is the portion adjoining Eukaby Hill, and it was recently reported upon by the Inspector of Mines in the following terms:—"Systematic prospecting is being carried out, and, to prove the ground thoroughly and economically, three shafts have been sunk across the supposed line of lodes, with the intention of proving the intervening ground by cross-cutting. One almost vertical shaft is down 128ft., and carries a smooth wall for the whole depth, the ground being hard, and sinking slow. At 120ft. there are fine veins of galena exposed in a width of lode of 8ft., which appear likely to unite and form a larger body in depth. Other two shafts are down 76ft. and 60ft. respectively, and the general prospects warrant further sinking and cross-cutting. Samples assayed by the Government Assayer contained 39 per cent. lead and 22ozs. silver to the ton; porous ironstone, 5ozs. silver; and a third, 62 per cent. lead and 31ozs. silver to the ton." (1889.) The secretary supplements the above by the statement that the area

leased from the Crown contains 480 acres, and that there are surface indications of eleven lodes, the strike being north-east and south-west, and the width 2ft. and upwards. Also that of the seven shafts sunk—four being vertical and three following the dip of the lode—the deepest is 161ft. The country consists of slate, and the matrix is ironstone.

**EUKABY EXTENDED.**—These two leases, containing 800 acres of land, adjoin the Blocks and the West Eukaby, and have recently become the property of English capitalists, who have sent out a mining captain to take charge. It is understood that a considerable amount of capital will be available for development, and the results will determine very speedily the value of this silver field. The Inspector of Mines, who recently visited the ground (1889), reported that the only work then done was in sinking two pits, in each of which an iron lode was disclosed, but samples that he took did not contain any mineral of importance. His opinion is that it cannot at present be placed on the list of promising mines.

**EUKABY HILL.**—This is another portion of the mineral area above referred to. It became the property of a Melbourne syndicate. The amount of nominal capital was considerable, but consisted very largely of paid-up shares, which the promoters received. There are several lodes of galena, iron ore, gossan, &c., running north-easterly in more or less parallel lines, and some of them are rich in galena near the surface, but have not been proved. Three samples from different lodes assayed 119oz. 8dwts., 45oz. 12dwts., and 6oz. 2dwts. respectively. The Inspector of Mines in decided terms condemns the expensive management of the mine, and states that there are no fewer than eleven shafts, one alone costing £600, without adequate reason for sinking. On the north side of the hill there are several bedded veins of ironstone carrying lead, as carbonate and sulphide. Small stones of grey ore can be selected that assay high for silver, but the general average is low. At best it can only be considered a fair prospect. The company own twenty-one blocks, containing 1,680 acres. (1889.)

**EUKABY SOUTH.**—Amalgamated with Eukaby Blocks.

**FIFTH CREEK CENTRAL.**—(See also COPPER.) This mine has developed in the direction of argentiferous deposits, and the Inspector of Mines estimates that the lode formation averages 20czs. to the ton. The following assays, which showed that the silver in every instance was in the form of chlorides, have been obtained :—(1) gossan, 19oz. 14cwt.; (2) clay, 11oz. 9dwt.; (3) ironstone, 410oz. 9dwt.; (4) flucan, 1oz. 2dwt.; and (5) grey ore, 84oz. 5dwt. It is stated that 13 tons treated at the Port Smelting Works averaged 48oz. silver to the ton, and realised £120 4s. 7d. The lode is patchy in regard to its silver-bearing so far as it has yet been driven upon; but it is certainly a well-defined fissure vein. The directors propose to drive by contract work a tunnel 200ft. to 300ft. lower than the present lowest level, with a view of proving the country for 370ft. below the top of the hill. The mine is now working, and during the five months ending February 28th, 31 tons were sold, which yielded an average of 50oz. silver per ton.

**FINKE'S MINE, Glen Osmond.**—Not much work done, and no information obtainable.

**FINKE'S SPRINGS.**—(See MOUNT SERLE.)

**FLINDERS MINE.**—Situated about three miles west of the Wirralpa Mine. Galena is said to have been found on the surface, and a good deal of sinking has been done, which has not proved much beyond the presence of poor copper ore; but the vein has not been followed down. (1889.)

**FLINDERS SILVER MINING COMPANY.**—Eighty acres, situated at the old Wirralpa Station, Blinman. No records.

**FOUNTAIN HEAD.**—Between Wirralpa and Blinman. Trenches and shafts have been excavated to find a galena lode, the existence of which is indicated by the presence of slugs and boulders of galena on the surface. Only small veins of galena and carbonate have been found near the junction of kaolinized slates and sandstones with crystalline silicious limestone. In the latter the lode will probably be found. There is a permanent spring of water here. (1889.)

**FRANKLIN HARBOR.**—Locality, Mangalo Creek. Near a hut on this creek thin veins of galena traverse mica schist and mica slate over a space of 40ft. to 50ft. in width. The galena is also found on the surface in the form of small rounded slugs. There are no workings, with the exception of a trench about six yards long and from 4ft. to 5ft. deep. The rock is soft and easily worked. The following are the results of assays made by the Government Assayer :—(1) galena, 2ozs. 9dwts. of silver ; (2) galena, 2ozs. 9dwts. ; (3) galena, 9dwts. 19grs. ; (4) galena, 1oz. 15dwts. 22grs. ; (5) galena, 16dwts. 8grs. ; (6) galena, 2ozs. 15dwts. 12grs. per ton.

**FROME WELL.**—(See MOUNT SERLE.)

**GILEAD P. BECK.**—Locality, Freeling Waters. A lode of massive galena  $1\frac{1}{2}$ ft. to 2ft. wide shows on the surface, on which two holes, respectively 4ft. and 6ft. deep, have been sunk, exposing a well-defined lode formation of galena and gossan with quartz. It strikes east and west through green clay slates, and the stone is good enough at the surface to warrant sinking a shaft to a considerable depth. A sample gave 12oz. 18dwt. 1gr. silver to the ton, and  $62\frac{1}{2}$  per cent. lead. The Government Geologist observed recently that a shaft had been put down 50ft., and a level had been driven 50ft. along the drive, which carried 2ft. to 3ft. of galena. The mine was worked four months in 1888, and was then abandoned, but has again been taken up.

**GILLES GLEN OSMOND MINE.**—This property is on one of the flanks of the Mount Lofty Range, three and a-half miles S.E. of Adelaide, and on it a very large amount of work has been done. The Government Geologist inspected this mine in October, 1888, and reported that the principal workings are on the Victoria lode, and there are three levels driven. The shoots of ore worked in earlier times dipped into the hill. The width of the lode formation varies from 1ft. to 4ft. or more. There are other parallel lodes upon which work has been done. Assays of various samples showed silver from 4ozs. 15dwts. to 35ozs. 9dwts. per ton, and lead from 16 per cent. to 70 per cent., the richer ores being obtained from the bottom level in the Victoria lode. The Glen Osmond lodes in general are small compared with some of those at the Barrier ; on the other hand, the ore contains the highest percentage of lead and a fair amount of silver, and besides, these mines have advantages in regard to transport, timber, &c. At the time of the visit of the Inspector of Mines (1889), operations were confined to three places, but he considers that there are five or six lodes in the claim all striking east and west, with at times a slight deviation south. The lode formations are so regular and well defined, that he expresses the opinion that by driving payable bunches of ore should be found. Mr. H. Conigrave, the manager, reports that there are fourteen lodes, six of which have been prospected and worked ; they strike east and west, and dip to the north at a ruling angle of  $70^{\circ}$  ; widths from 1ft. to 4ft. The O.G. shaft and winze goes down 260ft., Victoria 310ft., Gore 178ft., (2) Verco 178ft. and 100ft., all following the dip of the lodes. The total length of drives is 4,947ft. Matrix—iron, calcspar, sulphate of baryta, clay, gossan, and ferruginous quartz ; country, calcareous clay-slate. The ore is galena and carbonate of lead, giving an average assay of 21oz. silver per ton and 71 per cent. lead. An English proprietary company worked the mine from 1847 to 1850, paying a royalty to the owners of one-eighth, and extracted from the property £30,000

worth of silver and lead. An unsuccessful demand for reduction of the royalty led to a stoppage of operations until the existing company commenced work.

**GLENALBYN MINES.**—Established 1850. The property comprised four sections situated about one mile to the N.W. of Strathalbyn. Mr. J. B. Austin mentions that 18 fathoms below the surface a fine lode of galena was found, the ore of which was said to contain  $18\frac{1}{2}$  per cent. of lead and  $16\frac{1}{2}$  oz. silver to the ton. A shaft was sunk about 30 fathoms, and the galena was found to be impregnated with yellow copper ore. Several hundred tons of the ore were sent to England. The mine was lying idle in 1863.

**GLEN OSMOND UNION MINING COMPANY.**—Operations were begun on preliminary section No. 295, four miles east of Adelaide, in December, 1846. Thirteen lodes were discovered, but work was confined to three situated on the north and south extremities of the section and in the centre. Adits and levels were driven; winzes and four shafts were sunk. One hundred and sixty tons (including lord's dues) were shipped during eight months (March, 1884). Cartage, 7s. per ton; freight, 50s. per ton, free in London. This mine was at one time the property of Mr. Osmond Gilles; it was opened by him, and 200 tons of ore raised.

**GREAT BELTANA COMSTOCK.**—On the surface here there is an outcrop of galena about 2ft. 6in. long and 1ft. 6in. wide in a calcareous state; and there are other galena lodes in the neighborhood. Little work done. (1888.)

**GREAT COMSTOCK MINE.**—The proprietary of this mine hold twenty-four mineral claims, aggregating 1,920 acres, in the neighborhood of the Blinman, upon which very little work has been done. The Inspector of Mines states that a shaft has been sunk vertically 73ft., and then continued on the underlie to a depth of 117ft. on a poor formation consisting of calcite, baryta, and gossan, the surrounding country being limestone and argillaceous slate, not at all favorable for plumberiferous deposits. He did not observe any mineral of commercial value in the property, and certainly no lode formation worth prospecting on. (1889.)

**GREAT EXTENDED BELTANA SILVER MINING COMPANY.**—Area and locality, mineral claims 11830, 11831, 11832, 11833, 11834, 11835, 11836, 11837, and 11901, situate at Beltana. No further information.

**GREAT GLADSTONE MINE.**—In the Pyndelpena Creek, six miles north-easterly of Yeralina Station, and sixty miles east of Farina Station, on the Great Northern Railway. There is a lode formation, consisting of iron ore and gossan, containing fragments of the surrounding slate rocks, and striking north and south through the horizontal and slightly inclined clay and calcareous slates. Several shafts have been sunk, and tunnels driven along the course of the lode, and galena has been obtained in two or three places at no great depth. At the south end of the claim galena has been obtained which assayed well for silver. The lode is well defined, and well worth testing. A sample of the galena and gossan gave 88oz. 7dwts. 6grs. per ton, and 46 per cent. lead, and of gossan alone, 1oz. 15dwts. 22grs. silver per ton. The country in the vicinity is clay slate in horizontal beds, and cutting this almost vertically on a north and south line there is a strong fissure lode composed of argentiferous gossan and lead, and high assays of silver can be obtained. The lead makes in lenticular bunches. This lode should make down to great depths, and give richer deposits below. It is traceable for miles, and is lead-bearing throughout; its composition is carbonate of lime, gossan, and galena, and its character may be gleaned from the fact that three tons recently selected from the surface heaps and forwarded to the smelting works gave 50oz. of silver per ton and 45 per cent. of lead. These particulars are given in the report of the Inspector of Mines, who obtained an assay of a sample he took to the Government Assayer, showing 38 per cent. of lead and 59oz. of silver per



ton. On the occasion of a visit of inspection during February of the present year the same gentleman found that the hill shaft had reached a depth of 100ft., and was going down between two iron lodes, possibly branches of the same lode divided by a "horse" of country. The composition of each was the same, namely, ironstone of a gossany character, with veins of calcite in the fracture. Mr. Alfred Frost states that there are three lodes running north and south, the main lode ranging from 2ft. to 20ft. wide, with six shafts and drives 182ft. and 90ft. respectively. There are upwards of a hundred claims taken out in this locality, upon which very little work has been done up to the present time.

**GREAT MOUNT LYNDBURST SILVER MINING COMPANY.**—Two mineral sections, 11369 and 11370, 160 acres, thirty miles north of Beltana.

**GREAT NEVADA SILVER MINING COMPANY.**—Two mineral claims, 10449 and 10450, 160 acres, situated at Wirralpa.

**GREAT NORTHERN.**—Locality, two miles west of the Great Gladstone. There are well-defined lodes of ferro-calcite, calcite, iron ore, and gossan, striking north and south through horizontal slates. Prospecting shafts were being sunk at the time of inspection by the Government Geologist (1888), but no useful mineral showed itself to encourage further prospecting.

**GREAT NORTHERN SILVER MINES COMPANY.**—Possessed of interests in the North Gladstone and Big Hill Mines, and in section 19929, and of six sections at Pindalpina. Limited prospecting has been done, but nothing very encouraging discovered beyond the fact that there are two well-defined lodes of ferro-calcite, calcite, iron ore, and gossan, striking north and south. (1888.)

**GREAT WESTERN DARK HILL SILVER MINING COMPANY.**—Two mineral claims, 11140 and 11141, 160 acres, thirty miles south-east of Mannahill railway station, adjoining the Prince Albert Mine.

**GREAT WINNOWIE CENTRAL SILVER MINING COMPANY.**—Two mineral claims, 11593 and 11594, about seventeen and a half miles from Beltana railway station, and adjoining the Beltana Broken Hill. No work done. (1888.)

**HAHNDORF.**—A silver mine was opened here many years ago, but is not now worked. A quantity of ore was raised, said to be of rich quality. Pieces of quartz and reef formation were found to carry a small percentage of galena, containing silver at the rate of 1½ozs. per ton. Mr. W. S. Whittington, the original worker of this mine, stated that ore raised by his party was assayed by Mr. Cosmo Newberry, and by assayers in England and Germany, and gave on an average 71 per cent. of lead and 21ozs. of silver to the ton. Operations were stopped by the flooding of the main shaft, and want of capital. The workings are in soft kaolinized clay, and sandy and plumbagenous slates. (1887.)

**HELENE SILVER MINE.**—The Inspector of Mines states that this property consists of two mining leases containing 160 acres, apparently taken up because of a large iron "blow" on a slight elevation, flanking a low range near Minburra station. A shaft was sunk 75ft., and a drive was put east and west on the course of the lode, which consists of gossany ironstone of great width. It has a north-east and south-west course. The surrounding country is clay slate, traversed by strong quartz reefs. (1889.)

**HOOPEE'S LUCK.**—A claim situated five miles south-west of Waukaringa, and at present worked for silver and lead, on a regular and continuous outcrop of quartz and gossany ironstone which extends for miles. Where the gossan prevails the lode

makes and carries a fair percentage of lead. Three shallow shafts have been sunk, and costeeening pits dug, and in these the lode formation may be seen, varying in size from 1ft. to 8ft. The course of the lode is W. 3° S., with an underlay S.E. at an angle of 75°. The lode matrix is admirably adapted for concentration, as the waste is very light. This claim is well worth testing to the water level. From a bulk assay of three tons of ore obtained from a surface trench and roughly dressed, 30 per cent. of lead and 6ozs. 14dwts. of silver per ton, were obtained. (Inspector of Mines, 1890.)

**HOPE MINE.**—Locality, about seven miles east-north-east of Taltabooka. Shafts have been sunk, one to a depth of 100ft., and crosscuts driven in slate and sandstone, near iron ore, gossan, and crystalline limestone outcrops, which are not lodes, and do not appear likely to contain any useful metal. (Inspector of Mines, 1889.)

**IMPERIAL MINT MINE.**—The Inspector of Mines reports that this mine is twenty-five miles east of Leigh's Creek railway station, on Mount Serle sheep run. In several places lodes have been opened up, and lead, in carbonate and sulphide forms, can be obtained, but not in payable quantities. The ground consists of micaceous and talcose schists, overlying a hard blue slate, and the outcrops of lodes are ironstone, stained with oxide of lead. There is a vertical shaft 92ft. deep, carried down to 50ft. in a formation composed of galena, pyrites, and argentiferous gossan; and then hard blue slate comes in. At the bottom a crosscut has been driven and a winze put down. There is a break in the slate, and walls are showing, enclosing what appears to be lode material about 3ft. wide, but no trace of lead or iron can be found in it. (1890.)

**JOHN BULL SILVER MINING SYNDICATE.**—Eight mineral blocks, 580 acres, three miles north-east of Westward Ho. No further information obtainable.

**JOKER.**—Locality, about twenty miles east of Ketchowla station. A large amount of sinking and driving has been done at this place on the ironstone outcrops, on the strength of traditions that silver had been found on assay of ore by somebody. The Government Geologist, after inspection in September, 1888, came to the conclusion that there were no lodes on the property, nor any inducement for anyone to do more than prospect the surface. The samples he tested were destitute of silver or any other metal of commercial value.

**JUBILEE SILVER MINING COMPANY.**—Two mineral claims, 10686 and 1160, 160 acres, twelve miles north-east of Wirralpa Silver Mine. No records.

**KANGARILLA MINE** is a property of 212 acres, parts of sections 797 and 796, hundred of Kuitpo, about twenty-two miles S.E. of Adelaide. The workings consist of a tunnel 150ft. long, and a shaft at the mouth of the tunnel full of water. A trace of ore shows on one wall here and there, and a vein of galena and carbonate of lead, about 3in. or 4in. wide, extends for 20ft. or 30ft. along the bottom of the drive. The sinking is very hard, and the ore-bearing portion of the lode very limited, so that unless it is very rich in silver, it would not pay to follow. (1887.) The Inspector of Mines visited it in the latter end of 1888, and reported that at the place where the principal work had been done there was a true lode formation about 3ft. wide, running east and west with a northern underlay. The work then done on the mine included Lean's tunnel, driven on the course of the lode 100ft., the formation being very small throughout; and on a shoot of ore cut near the entrance, followed down for 50ft., when sinking was stopped because the influx of water was so great. No. 2 shaft was on the hill, and was sunk to the level of the tunnel, 90ft. A good shoot of ore was passed through dipping east, and several tons of fair ore were obtained. A level was being pushed westward from the bottom of the shaft to connect with Lean's tunnel; this would save hauling, and enable operations to be concentrated on the

shoots of ore, besides assisting in the important work of sinking the shaft to a greater depth. There is every indication that this lead lode will improve in depth.

**KANGAROO ISLAND** (see also **WESTERN RIVER**).—At Western River there are some mineral claims traversed by a large lode showing a continuous outcrop for their whole length. It varies in width from 50ft. to 250ft., and bears about S.W. by N.E., and is composed of quartz showing in places galena and carbonate of lead. In one place the cap of the quartz has been broken through to a depth of 5ft. or 6ft., and a solid lode of galena disclosed 5ft. or 6ft. wide, and assaying about 78 per cent. of lead, and 12ozs. silver to the ton of ore. At this point, on the surface, the lode shows a width of 150ft. (Captain W. H. Price, 1887.)

**KEYNETON**.—There are one or two silver-lead mines in this neighborhood, but there is no record of work done or results obtained.

**KEYNETON KING**.—The Inspector of Mines reports (1889) that this claim, situated in the hundred of North Rhine, contains two distinct iron outcrops, upon which several openings have been made, showing formations composed of manganic iron, silica, and galena, with pockets of a kindly-looking gossan. Galena taken from the footwall and submitted to the Government Assayer gave 63 per cent. lead and 32ozs. 13dwts. silver per ton, and from the hanging wall 8ozs. more silver. Samples taken from the bottom of the opening, 16ft., gave—(1) 60 per cent. of lead and 35ozs. 2dwts. silver per ton; (2) 69 per cent. and 45ozs.; (3) 68 per cent. and 41ozs. The 16ft. sinking produced about 2½ tons of hand-picked ore of similar quality. The course of the lode is north and south, with an underlay east. Mr. Niehuus has supplied the following additional information:—Operations have been resumed on this property. More than thirty years ago Captain Rodda mined for silver in the neighborhood unsuccessfully. It is only recently that the true fissure lode was discovered, and the intention is to float a company. One hundred and twenty acres of private property are held at a rental of £45 per annum and a 5 per cent. royalty. There are two lodes, striking north and south, which underlie east, 4ft. and 5ft. wide respectively. There are four shafts, two vertical and the others following the dip of the lode, which has a matrix of iron gossan and clay. Harrold Bros. have given an assay of 62ozs. silver per ton and 76 per cent. lead, and a bulk of 1½ tons gave 39ozs. silver per ton and 64 per cent. lead. Carriage of ore to Port Adelaide is 18s. per ton.

**KEYNETON PROPRIETARY MINE**.—This mine, started a little over two years ago, is situated in the hundred of North Rhine. The Inspector of Mines, after an examination in July, 1889, reported that a considerable sum had been spent in costeening and sinking shafts, some of which have been sunk apparently without a definite object, and one is in a slate formation its whole depth. In the trenches lead has been found in small pockets lying on hard limestone. The country is not congenial for lead ores in large bodies, and there is nothing observable on the property that would justify further expenditure.

**LADY ELIZABETH MINE**.—Locality, about one mile south of Olary railway station. A shaft has been sunk about 20ft., and a drive put in for a short distance. Galena in small quantities is disseminated through the limestone rock, but the prospect of a lode being found by continuing work is not encouraging. (1888.)

**LADY SMITH SILVER MINING COMPANY**.—Two mineral claims, 11129 and 11130, at Wilpena.

**LOBETHAL**.—Locality, twenty-seven and a half miles east of Adelaide. A silver mine was opened near this township many years ago. The lode runs north and south, and is composed of iron gossan, quartz, and mundic. A vein of cobalt and silver is said to exist in the same lode, being principally an ore of cobalt. (See under **COBALT**.) (1887.)

**MABEL EXTENDED SILVER MINING COMPANY.**—Four mineral blocks, 320 acres, situate near Beltana. The work consists of deep open cuttings across an outcrop of rock containing iron ore and manganese, with no appearance of any lode or vein.

**MABEL SILVER MINING AND PROSPECTING SYNDICATE.**—Mineral claim, 11636, Beltana, adjoining Beltana Broken Hill S.M. Co.'s property.

**MACFARLANE'S MINE** is in the neighborhood of the Glen Osmond mines, and forms one of the same group. Very little work has been done.

**MAMMOTH SILVER MINING PROPRIETARY COMPANY.**—Locality of property, Willaipa. No records.

**MANGALO CREEK.**—(See FRANKLIN HARBOR.)

**MANNAHILL.**—Seven miles south of the railway station a small vein of galena has been discovered. It is associated with gossan, quartz, and carbonate of lead, and occurs in bluish clayslates and sandstone. Three holes, the deepest 6ft., have been sunk, but no defined reef has been disclosed. (1886.) (See GOLD.)

**MAY BELL.**—A tunnel has been driven in horizontal kaolinized shales and sandstones for a distance of 50ft. or 60ft., but no ore has been found. (1888.)

**MID-NORTHERN MINING COMPANY.**—Ten mineral licences in various localities. No information procurable.

**MILDALTIE SILVER AND COPPER MINE.**—(See COPPER.)

**MOORE BROS.' DISCOVERY.**—In 1888 a discovery of silver lead was made in a locality about a mile and a half S.S.E. of the Mingary reefs in slate country. The galena and carbonate of lead form a vein about 12in. thick, underlying west at a low angle, and galena occurs in a very pure condition in large slabs. An assay made by the Government Assayer gave 18oz. 6dwt. silver per ton.

**MOUNT BOLD MINE.**—(See COPPER.)

**MOUNT DISTANCE.**—Here there is a galena lode at the top of the Mount. It lies west of Gilead P. Beck's mine, and is apparently the same line of lode. (1889.)

**MOUNT FREDERICK SILVER MINING ASSOCIATION.**—Property, 373 acres, at Rhine Valley.

**MOUNT GRIFFITHS.**—(See COPPER.)

**MOUNT JAMES.**—Nine mineral claims, near Beltana.

**MOUNT LOFTY PARK MINE** is situated on section 840, hundred of Onkaparinga. The Inspector of Mines, after examining the property, reported that the workings consisted of a drive on the course of the lode about 25ft., in which a winze had been sunk 24ft. At 18ft. drives were put in east and west, and in the latter 11ft. exposed a solid lode of cubical galena 2½ft. thick. The east drive is about 20ft., but the lode is not so large in the back, though similar to the west portion under foot. The course of the lode is east and west with a slight dip to the north. The shoot of ore appears to be making payable ground in depth. The lode running into steep hills may be advantageously worked by means of tunnels, and about 300ft. of backs might be obtained by about the same length of drive. The value of the ore is about £6 per ton, and with a yield of 5 tons of selected ore per fathom, the

outlook is a very promising one. Since the date of this report a tunnel has been driven at a lower depth, and a winze put down and other drives put in on the course of the lode. Work is partly suspended, pending mechanical appliances for dealing with the water and dressing the ore. (1889.)

**MOUNT LYALL.**—Locality, a mile and a half north of Wirrialpa. A lot of costeeening has been done near the outcrops of iron, and promising assays of silver were said to have been obtained, but the Inspector of Mines reports that he saw nothing that would warrant working. (1889.)

**MOUNT OSMOND.**—Situated at Glen Osmond, about four miles south-east of Adelaide. There are two principal lodes, named respectively the Champion and Wheal Augusta. On the former the workings comprise a tunnel driven along the centre of a quartzite bar in clay and calcareous shale, carrying flat leaders of galena and gossan, zinc blende, calcspar, and quartz. The Wheal Augusta is a true lode, with walls 2ft. to 3ft. apart, bearing east and west to E. 10° S., with an underlie 70° to 80° north. In sinking deeper more solid country may be expected, and with it a larger and richer lode. An assay gave 55 per cent. lead and 11ozs. 9dwts. silver per ton from the Wheal Augusta and 35 per cent. lead and 7ozs. 7dwts. silver per ton from the Champion. (Government Geologist, August, 1888.) The Inspector of Mines reported, at the close of 1889, that the tunnel was driven 320ft., and had disclosed three lenticular shoots of ore. The lode formation consisted of gossan, baryta, and galena in nodules, and was 6ft. wide from wall to wall at the end of the drive. A sample assayed by the Government Department yielded 73 per cent. lead and 18ozs. silver per ton.

**MOUNT RHINE SILVER MINING COMPANY.**—Section 17, 173 acres, hundred of Angas; 173 acres held at a nominal rental for twenty-one years. The Secretary (April, 1890,) supplies the following particulars:—There is an east and west lode, in the upper part 5ft. wide and increasing to a width of 40ft., and another north and south many yards wide; dip 45° S.; a shaft is down 80ft. and a winze 20ft.; and drives have been put in 180ft. and 30ft. The ore gives from bulk 10oz. of silver to the ton and 20 per cent. of lead. Some assays have given 45oz. of silver and 70 per cent. of lead, and one 49oz. of silver and 1½oz. of gold. This mine has been working for two years, in the first instance for silver, but latterly, because of the immense quantities of ochre found in the mine, for the latter material.

**MOUNT ROEBUCK SILVER MINING COMPANY.**—Two mineral claims, 10972 and 10973, 160 acres, at Blinman.

**MOUNT SEBLE.**—Locality, thirty-two miles S.E. of Leigh's Creek railway station, and about one and a half miles east of Stuart's Waterholes. A lode of rich galena and carbonate of lead has been prospected 2ft. or 3ft. below the surface, and has a promising appearance. Between Finke's Springs and Frome Well galena and carbonate of lead have been found in three or four localities in clay and calcareous slaty shale, the lode formation being calcspar and ferro-calcite, with sometimes quartz and ferruginous gossan. These lodes are worth further prospecting. Assays made by the Government Assayer from ores procured from these claims show:—Cerussite, one and a half miles east of Stuart's Waterholes, 58·5 per cent. lead and 3ozs. 9dwts. silver per ton; galena, 65·4 per cent. lead and 1oz. 3dwts. silver; galena from No. 2 claim, one and three-quarter miles west of Frome Well, 70 per cent. lead and 8ozs. 10dwts. silver; cerussite from most westerly claim, 70 per cent. lead and 7ozs. 4dwts. silver. No recent information.

**MULDANIPPA HILL SILVER MINING COMPANY.**—Property situate near Oulnina. No information.

**NACKARA MINING COMPANY.**—Property, eighty acres, part of section 184,

hundred of Coglin, and block 12307, situate within six miles of the Oodla Wirri railway station. No records.

**NEVADA MINE.**—Locality a mile and a half north of Wirrialpa; area 160 acres, on which there are several iron backs, one of them a fissure lode, 12ft. thick. A downright shaft 30ft., a crosscut 9ft., and a shaft continued 70ft. on the underlay at an angle of 50° showed no encouraging results. Samples taken by the Inspector of Mines showed no trace of silver. (1889.)

**NEW LUXEMBERG REEFS.**—(See MINGARY.)

**NILTIBURY.**—Near Blinman. A quantity of work done on an outcrop of iron ore (oxide), with carbonate of copper stains in crystalline limestone, and on quartz and manganese veins, and on a vein of galena. No information as to results. (See WEEPOWIE and NILTIBURY MINE.) (1888.)

**NONPAREIL SILVER MINING SYNDICATE.**—Fourteen mineral claims, each eighty acres, situate on Oulnina run.

**NORTH GLADSTONE.**—Near Great Gladstone. No records.

**NORTH BELTANA SYNDICATE.**—Costeening has been carried on in hard crystalline limestone, in which a few specks of galena are occasionally seen. (1888.)

**OLARY SILVER MINING COMPANY.**—Four mineral sections, 10649, 10652, 14162, and 14163, 320 acres, situate two and a half miles from the Olary railway station, formerly known as Batchelor and Moody's Great Iron Blow. At the period of the Government Geologist's visit a shaft had been sunk on the north side, and another was being sunk on the south side (depth about 45ft.) of a large outcrop of silico-ferruginous lodestone stained with copper carbonate, and containing pyrites. The stone looked likely for gold, and an assay of a sample of the ore containing pyrites yielded silver at the rate of 3oz. 9dwt. per ton; gold, a trace. There are numerous quartzose and ferruginous reefs with copper stains in the neighborhood which appeared likely to contain gold. The rock formation is gneissic micaceous granite, mica slate, &c., with eruptive granite. The Inspector of Mines reported subsequently (1889) that the shaft on the south side was down at a depth of 110ft. in a solid body of pyrites, which sampled (1) 1dwt. 12grs. gold; surface heap, 1dwt. 8gr. gold per ton. Driving east on the lode an excellent quartz and pyrites leader is followed. (See under GOLD.)

**OLD STRATHALBYN MINE** adjoins the Wheal Ellen property. A shaft was sunk in the gossan for a depth of four fathoms, and then the gossan was found to carry gold and silver down to 7 fathoms, when it began to make carbonate of lead. Sinking deeper, the lode was found to be about 12ft. wide, and to be composed of sandy mundic, zinc blende, and galena of low percentage. A drive at the 17-fathom level cut through about 10ft. of zinc blende and galena of about 20 per cent. of lead. At this level a counter branch was met with composed of white quartz and galena, free of zinc and mundic and rich for silver. At the 22-fathoms level a change took place; the galena and zinc blende forming themselves into separate leaders. Specimens are said to have yielded 65 per cent. of lead, and 40oz. of silver to the ton. The shaft was sunk 7 fathoms below this level. There is no record of ore raised, and the mine has not been worked for many years. (1887.)

**OLD BELTANA MINE.**—No records.

**OODLA WIRRA SOUTH MINE.**—(See GOLD.)

**OULNINA**, fourteen miles S.E. of Mannahill. Veins of galena have been found in various sinkings in this neighborhood. (See TRINKALEENA, &c.)

**PARINGA MINING COMPANY.** (See COPPER.)—A lode of black carbonate of lead was found on this property, in addition to the copper lode. (See the **WHEAL MARGARET SILVER-LEAD MINE.**) (1887.)

**PATSEY'S SPRINGS.**—One mile west of these springs a prospecting party have discovered a lode composed of galena and carbonate of lead, calcspar, and quartz. An assay of the ore gives 7oz. 2dwts. 11grs. of silver per ton, and lead 57 per cent. (1888.)

**PHILLIPS' MINE,** Rapid Bay, sixty-two miles S.W. of Adelaide, was opened in 1844. The lodes of lead were close to the surface, and are said to have yielded 75 per cent. of lead and about 23oz. of silver to the ton. After about fifty tons of silver-lead ores were raised, the work ceased from some cause not stated.

**PRINCE ALBERT SILVER-LEAD MINE.**—Locality, about thirty miles north-east of Mannahill railway station, and about a mile and a half from the Dark Hill claims, which have been amalgamated with this. The Inspector of Mines says (1888) there is a vertical shaft 80ft deep, from the bottom of which a crosscut has been driven south 147ft. In the costeeining pits south of the shaft there is a large body of quartz exposed, in which lead in the form of carbonate and sulphide can be seen. No. 1 shaft was sunk vertically 28ft., then at an angle of 52° for 22ft., following the underlay. At this depth a crosscut was driven 26ft., all in lode formation, pockets of lead ore being frequently met with. Samples taken from various places in this crosscut give an idea of the value of the ore, according to returns by the Government Assayer—(1) 61 per cent. of lead, 14ozs. 1dwt. silver per ton; (2) 67½ per cent. of lead, and 16ozs. 16dwt. of silver; (3) 70 per cent. of lead, and 21ozs. 18dwt. silver; (4) 30 per cent. of lead, and 10oz. 14dwt. silver per ton. That the lode makes in depth is shown by the fact that at 20ft. vertical the lode is barely 6ft. wide, whilst 30ft. deeper it has been proved for 26ft. without the hanging wall being sighted. The strike of the lode is east-north-east, and it makes lenticular masses of ore. Further east another shaft discloses a similar shoot of ore. The country is favorable, consisting of micaceous and talcose schists, impregnated with thin pipe veins of ferruginous matter. This may be regarded as a most promising mining venture. In January last the Inspector again visited this property, and was confirmed in his favorable opinion as to its prospects.

**PRINCE ALFRED.**—(See under COPPER.)

**PROVINCIAL MINING Co.**—Property situated five miles S.E. of Adelaide. No records obtainable.

**PULPARA AND CAROONA UNITED.**—Locality, Pulpara and Caroona. Property held under mineral licences. No records.

**PUTTAPA MINING COMPANY.**—Locality, seven miles north of Beltana; area, five mineral claims. It is stated that silver, gold, and copper have been found on this property. No information obtainable.

**QUORN COMSTOCK.**—Locality, twelve or fourteen miles north of Quorn, and near Mount Arden. A shaft has been sunk 25ft. on a massive outcrop of brown iron ore, supposed to contain silver, but no assaying was done before undertaking the expense of putting down a shaft. (1888.) No further information.

**RAVENSBURG MINE.**—The Inspector of Mines visited this property recently, and reports—It is situated about a mile and a half from Hahndorf, in the hundred of Onkaparinga. A few holes have been sunk on an ironstone formation which is about

3ft. wide, and which is apparently a true fissure-vein bearing north  $10^{\circ}$  east, and underlying west. The ground is in an auriferous belt of country, and possibly the ironstone may carry gold in depth.

REPUBLIC.—On the Mingary line of reefs.

RHINEBERG PROPRIETARY SILVER MINING COMPANY, holding a lease of 233 acres, section 38, hundred of Angas. The Secretary supplies the following :—There are two lodes, striking N. and S., about 5ft. wide. Two shafts have been sunk and some costeening done. Specks of galena are found in a soft gossan, in a micaceous schist country ; but the company has wound up recently for lack of capital. (1890.)

RHINE VALLEY SILVER MINING COMPANY.—Locality and area of property, six sections, 10550, 10556, 10084, 11442, 11443, 11445, and 11655—550 acres. The Secretary (April, 1890,) states that this property is forty-eight miles from Adelaide, on the edge of the Murray Flats, and contains two lodes of an average width of 5ft., with a dip of  $45^{\circ}$  E. The deepest shaft is 90ft., and a drive of 60ft. has been put in. The lode contains galena in ironstone, with micaceous schist country ; the ore is patchy. The mine was first opened in 1888, having a good surface show. Assays have been had up to from 30 to 40oz. silver per ton, and 60 per cent. lead.

RIVERSEDGE MINE, on the banks of the Torrens, thirteen miles from Adelaide, was worked for copper in 1847. A lode of silver-lead was subsequently discovered, and an assay of the ore made at the time by Dr. Davy showed the proportion of silver to be about 627ozs., to the ton of ore. The works were stopped for want of capital.

ROBERTSTOWN SILVERFIELDS.—Locality, about twenty-eight miles from Kapunda, a little east of north. Early in 1886 a discovery of silver was reported, and from fifteen to twenty claims were taken out and worked. Assays were made, and results varying from 3ozs. to 30ozs. of silver per ton were reported. Numbers of shafts were put down, one to a depth of 100ft. In May, the Government Geologist examined the material raised from the shafts and the workings, and was unable to detect the presence of any metallic minerals, except iron ores and manganese, with two exceptions—Moonta claim and Murphy's claim. In the first there were small quantities of galena, and copper in the second. This result, coupled with the absence of vein structure, led to a doubt of the presence of silver in anything like payable quantities. He collected samples, more especially from those points whence good returns were said to have been made by assay. These samples—twenty-two in number—were submitted to the Government Assayer, and out of the whole number only one, that from the Moonta claim, yielded any silver. The result was 13dwts. per ton. As far as could be ascertained, the men working in the mines had never seen any silver ore in the stone they had been raising, but depended altogether on the "assays," which encouraged them to continue. The mystery regarding the results given by the assayers will most probably never be satisfactorily cleared up. Much money, time, and labor were wasted in searching for a metal which does not exist in appreciable quantities in this locality. (May, 1886.)

ROYAL KEYNETON.—Locality, hundred of North Rhine, part of sections 825, 826, and 828. The Inspector of Mines reports (1889) that several shafts have been sunk, but none to any great depth ; but a main shaft was being put down by nine men. The surface is covered by a stratum of limestone, which appears to be of synclinal and anticlinal formation, and large nodules of galena, rich in lead and carrying a fair percentage of silver, were observed, but in limited quantity. In the main shaft there is a bed of gypsum with veins of iron and specks of galena in the cleavage, probably deposited by infiltration. In the old workings there is a vein of blende and galena. A lot of costeening has been done, but nothing found except nodules of galena enclosed in limestone. There are two ironstone "blows" showing lead, but in small quantity. The mineral indications warrant efforts at development.



**ROYAL MINT.**—Locality, three miles north-east of Finke's Springs. A prospecting shaft has been sunk alongside a large outcrop of iron ore. (1888.) No recent information.

**RUFUS SILVER-LEAD MINE.**—Situated in Bimbowrie paddock, near Mount Victor, about twelve miles from Teetulpa. The Inspector of Mines states that the ground is favorable for silver-lead lodes, being composed of fine micaceous schist. The claim is opened up to a very limited extent, there being only two pits sunk, each showing a lode formation. A branch on the footwall carries lead ore, a sample of which assayed 10 per cent. lead, and 13ozs. 6dwts. silver per ton. Other samples yielded 9ozs. 10dwts. silver and 4grs. gold per ton. The lode should be followed down on the underlie. (1889.)

**SCOTT'S CREEK MINE.**—This property is situated about three miles from Callington railway station, and a mile and a half from the Aclare Mine. There is a large formation, which bears north and south and dips west. The Inspector of Mines says that, judging from the excavations, a large quantity of lead ore must have been obtained from an irregular lenticular body. In the south stopes there are veins of ore distributed through a formation of 12ft., but not in anything like payable quantities. Taking the surface indications, it appears as if, where the large mass of ore was found, at least four branches joined, and a further search northward should be made for a continuation. There are some geological features which this mine bears in common with the Aclare in the regular splitting of the lodes, the difference being that in the latter they are south, whilst here they are north. A vertical shaft has been sunk 120ft. on the west or hanging-wall side of the lode, and a crosscut is now in 43ft. westerly, intersecting veins of mineralized quartz and galena; but there are no extensive bodies, so that an extension will be required to cut the footwall of the lode. This mine, like others in the neighborhood, can be developed cheaply, and a low-quality ore can be made to yield profits, as there is plenty of water for dressing purposes. The mine is worthy of further testing. (1890.)

**SELICK'S HILL,** one and a half miles east of Aldinga Bay, and five miles south of the township of Aldinga. Silver-lead was found in the hills about a mile from the township. Some holes were put down, but no results are on record. The Inspector of Mines reports that the strata consists of a crystalline blue limestone; but westward of the workings there are bands of blue clayey slate, striking south-south-west and north-north-east. A shaft 3ft. and a drive 30ft. through limestone represent the work done, and cavities of gossan iron-ore, with veins of calcite, were met with. Half a mile south a large quartzite lode carries specks of galena. Assays from the northern end of the claim are said to have yielded 7ozs. silver to the ton; but the general features of the property do not encourage working. (1889.)

**SOUTH AUSTRALIAN BROKEN HILL MINE.**—Locality, about eight miles south-east of Oulnina woolshed. A shaft has been commenced (June 3rd, 1888) on a lode striking east-north-east, and underlying to the southward at an angle of about 45°. It is composed of quartz and oxide of iron, with carbonate of lead and copper. The width varies from 1ft. to 6in. The shaft has not been sunk to a sufficient depth to show whether the lode is likely to be permanent or not, nor are the surface indications such as to indicate the presence of a large permanent lode. It is worth being prospected in a more energetic manner, but the published reports concerning it appear to be greatly exaggerated. The samples of ore brought from the mine assayed 36ozs. 11dwts., 42ozs., 8ozs. 10dwts., 8ozs., and 11ozs. of silver and a trace of gold per ton. On a second visit to the property the Government Geologist was not permitted to descend the shaft; but on a subsequent occasion the Inspector of Mines inspected, after which he reported that he did not observe any lead on the mine, nor could he by assay of samples detect the presence of silver or lead. This fact points to the probability that the lode seen by the Government Geologist (1888) had either not been followed down, or that the mineral deposit he saw had been worked out.

## SOUTH AUSTRALIAN COMPANY'S COPPER AND LEAD MINE.—(See COPPER.)

**SOUTH AUSTRALIAN PRINCE ALBERT.**—Locality and area—mineral licence 7439, near Giles' Nob, Oulnina Run, covering eighty acres. No records.

**SNUG COVE.**—The Inspector of Mines reports that there are several outcrops on the hillside within a few chains of high-water mark at Snug Cove. In one, lead being found, an underlie shaft was sunk 35ft. carrying the lode down. It strikes east and west and dips south. It is a fissure lode, and its constituents favor shoots of lead ore. At present it carries lead as carbonate and sulphide. The enclosing country consists of micaceous slate, and is favorable for the existence of lead lodes. (1889.)

**SPRINGFIELD FREEHOLD SILVER-LEAD MINING SYNDICATE.**—Sections 921, 1004, and 1076, 240 acres, near the Eagle-on-the-Hill, and adjoining the Eagle Silver Mine. No records of work done.

**STANDARD SILVER MINING SYNDICATE.**—Mineral block of eighty acres, at Glen Osmond. (No records.)

**SUNBEAM CLAIM.**—This lies adjacent to the Rufus Mine, near Mount Victor. A shaft has been sunk upon the property, opening to view a ferruginous quartz lode, carrying bunches of silver-lead ore. No further information received.

**STAR OF HOPE.**—(See MINGARY REEFS.)

**TALISKER MINE.**—This mine, which lies fifteen miles south of Normanville, and about three miles north of Cape Jervis, was opened about June, 1862, and was worked till about June, 1872. There are four or five lodes, but only one—the Talisker lode—was worked. The bearings of two of them were N. 6° W., and of the others N. 40° E., and the average underlay was about 2ft. per fathom. The width varied from 6in. to 22ft. On the surface the ore consisted of arseniates, phosphates, and carbonates, and at 10 fathoms below the surface, galena. Some of the surface ore went as high as 200oz. of silver to the ton, but the average of the mine was about 40oz. of silver. The veinstone associated with the metallic minerals is arsenical pyrites and quartz; in some places zinc blende. The country rock is crystalline schist. Seven shafts were sunk, the deepest being 432ft., and various drives were put in for a total length of 3,500ft. The ore was found intermixed with quartz, arsenical pyrites, and indurated slate; it was also found in shoots of various lengths and widths. These shoots dipped south at an angle of about 50°. The arsenical pyrites contained gold, silver, lead, iron, arsenic, and sulphur; and in some places blende, but none of these minerals were in sufficient quantity to pay for extraction. The foregoing information has been supplied by Mr. W. H. Price, M.E., and the following is gathered from extracts from a letter in the possession of Messrs. Harry, Harvey, & Co.:—The proceeds of ore raised were about £16,000. The gross proceeds of silver-lead sold were £29,885 15s., ranging from £27 10s. 9d. to £39 16s. 6d. per ton of 20cwt. The average cost of freight, commission, and all other disbursements in silver-lead sold in London was 6½ per cent. The quantity of silver-lead shipped was 939 pigs, and 30,593 ingots, the total weight being 889 tons 4cwt. 0grs. 4lbs. of 20cwt. to the ton. The percentage of silver contained in the lead ranged from 62ozs. to 91ozs. 13dwts. 20grs. per ton. The lead was sold at £16 12s. 6d. to £22 per ton; the larger quantity at £17 5s. per ton. The silver sold at 5s. 4½d. to 5s. 6d. per oz., the larger quantity at 5s. 5½d. The lead produced in 1870 contained an average of 69ozs. 12dwts. 11grs.; and in 1871 the average rose to 86ozs. 9dwts. 4grs., being an increase of 23½ per cent. of silver per ton of lead. The mine stopped working for want of capital. Working having been recently resumed on this property, the Inspector of Mines has examined and reported upon it. He states

that there is a series of lodes on the claim, 197 acres, four of which are on section 1554, whilst on Campbell's Creek Mine, now part of the Talisker property, there are three more. On the main lode, known as the Talisker, four shafts have been sunk, and hundreds of feet of drives put in. The width of the lode varies from 12in. to 22ft., and carries the richest ore in shoots dipping south, whilst large pockets of ore make at times into the hanging-wall. These yield many tons of good ore. The composition of the lode is quartz, arsenical pyrites, indurated slate, and galena, and it is very suitable for concentration. From the records obtainable the lead carried 1oz. of silver per unit, so that 50 per cent. of lead would carry 50ozs. of silver, making the present value £14 10s. per ton on the mine. The situation of the mine gives special facilities for dressing and sending the ore away by sea. The mine being full of water, the Inspector could not examine the underground workings, but quotes Captain Tresize, manager of the Broken Hill Bonanza, who formerly worked in the Talisker Mine, and who states that the ore portions of the main lode carry a good percentage of high-grade argentiferous galena, of much better quality than any of the sulphide ores yet met with on the Broken Hill Proprietary line of lode; and he has often wondered that so valuable a property was allowed to lie idle so long. The Inspector of Mines again examined the mine in April, 1890, and confirmed his previously-expressed conviction of the value of this property.

**TEATREE GULLY SILVER MINE.**—This is situated not far distant from Modbury, and was recently visited by the Inspector of Mines, who reports that it contains an immense outcrop of ironstone, apparently striking north and south, and traceable for two miles. In a large excavation, fully 100ft. in diameter and 30ft. deep, a shaft 150ft. deep has been sunk, showing a lode of compact ironstone the first 20ft.; it is then thrown out of the shaft to the west, and for 30ft. the shaft goes through sand-drift, changing at that point into stone, which goes to the depth mentioned. A crosscut west intersects the lode at 25ft. from the shaft, and at that depth it is found to consist of honeycombed quartz, oxide of iron, and a nice gossan, with stains of copper. The general appearance of the lode is favorable to the theory of it becoming charged with pyrites and gold-bearing in depth. The crosscut is now in a highly mineralized strata, full of quartz stringers, showing pyrites and carbonate of copper, and this should be driven further, and the mine tested to water level. (1890.)

**THREE BLOCKS SYNDICATE.**—Property on the Oulnina Run, near Mannahill, and a wide quartz reef containing galena is being sunk on. It strikes north and south and has smooth walls. The percentage of galena it contains is small.

**TRENGOFF GOLD AND SILVER CLAIM.**—(See under "GOLD.")

**TRINKALEENA**, about sixteen miles east of Mannahill.—Several shallow shafts have been sunk on a small galena vein. The most northerly of these is about 25ft. deep, on a leader composed of quartz, galena, and iron pyrites, 4in. or 5in. thick, stained with copper. The percentage of galena is small. The second shaft, 10ft. deep, is on a vein of galena, with gossany quartz, striking E.N.E. In the third shaft, about 25ft. deep, the vein of galena is larger and richer than that in the other shafts; the wall is also better defined. There are shallow shafts and holes in the neighborhood, but no ore of importance appears to have been obtained from them, nor has any work been done for some time past. (1888.)

**UNCLE TOM SILVER-LEAD MINE.**—Locality, Mingary. The Inspector of Mines reports:—Near the top of a round hill there is a formation about 3ft. thick, striking north-east and south-west, with a dip 20° north-west. A vertical shaft, 9ft. deep, has been continued on the underlay 20ft., and a little lead shows, intermixed with mica schist. In open trenches near the shaft several tons of good cubical and steel-

grained lead ore were obtained. The costeening done has not proved the ground properly, but the strata is unfavorable for permanent lodes. The claim is in a mineralized belt of country, and deserves further and systematic prospecting. A trial of samples by the Government Assayer gave  $72\frac{1}{2}$  per cent. of lead and 41ozs. of silver per ton. (1890.)

**VICTORIA MINT SILVER MINING COMPANY.**—Property at Mount Serle, adjoining the Imperial Mint Company's claim. No records.

**WATERYALE.**—Near this village a shaft has been sunk by Mr. Badcock and others, 30ft. in brown iron ore. This is a bed or capping of iron ore, and not a lode, and there is no chance of obtaining silver. (1889.)

**WAUKARINGA.**—A few miles westward of Blackfellows Reef galena was found in an excavation a few feet deep, on a ferruginous quartz lode. An assay showed that this ore contained 12ozs. 14dwts. 19grs. of silver to the ton. No further information obtained.

**WEST EUKABY MINE.**—This property adjoins the Eukaby Hill and the Eukaby Extended mineral sections. A large quantity of galena and carbonate of lead with manganese and gossan has been raised from a lode at a shallow depth; it has been traced for some distance running north-east and south-west, and contains silver-lead. Three samples from this lode when tested gave respectively 18ozs. 3dwts., 12ozs., and 36ozs. 5dwts. of silver per ton. Although not large, the Eukaby lodes are rich in ore as a rule, and are likely to continue to a considerable depth and to develop larger masses of ore when sunk upon. The bed rocks are calcareous slates and limestones. After a more recent visit (1890) the Inspector of Mines reports that considerable work has been done in sinking trial shafts along the line of the lodes. No. 5 shaft contains a true fissure lode, 3ft. thick at the surface, and gradually widening as depth is attained. The course of the lode is north-west and south-east, underlying south-west at an angle of about  $75^\circ$ . The matrix of the lode is argentiferous ironstone, highly favorable for carrying shoots of silver-lead ore in lenticular branches. Assays also prove the iron to be auriferous. There are parallel lodes which could be proved by crosscuts from this shaft. There are favoring indications in the other shafts, one of which is down 90ft., and another 60ft., and there has apparently been legitimate effort to prove the ground, the mineral indications being very encouraging. Capital should be employed to put the shafts down to a greater depth, and there is little doubt the company would be rewarded by finding mineral deposits of value. The mine continued working until water-level was reached, and then a crosscut was driven 37ft.; but the lack of capital has prevented the purchase of machinery, and operations have been temporarily suspended.

**WEEPOWIE AND NILTIBURY MINE.**—Locality, eight miles north-west of Blinman, on the Moolooloo sheep run; area, 640 acres. Mr. Henry Sutcliffe states there are three lodes—two north and south, respectively 15ft. to 20ft. and 10ft. to 12ft. wide, and one east and west 20ft. wide; three shafts 10ft., 96ft., and 87ft. deep; and 210ft. of drives. The matrix of the ore is quartz and ironstone, and the nature of the country rock is silicious limestone, with dykes of sandstone, quartzite, and clay slate. The galena gives 50 to  $72\frac{1}{2}$  per cent. of lead and from 3ozs. to 12ozs. of silver per ton, and the quartz from 6dwts. to 15dwts. of gold. The Inspector of Mines reports (1889) that a great deal of work has been done on the claim on two outcrops 100ft. apart. Strike of lode, north-north-west and south-south-east, underlying slightly east. The percentage of lead is high ( $71\frac{1}{2}$ ), but the quantity of silver in six samples did not in any instance reach 5ozs. To the westward a shaft sunk 49ft. shows a fair display of argentiferous lead and carbonate of copper. The main lode exhibits lead in patches for two miles. Some old workings show massive lead ore,

**WESTERN RIVER SILVER MINE.**—The Inspector of Mines comparatively recently visited this mine, which is in the locality indicated—Kangaroo Island, one mile from the sea coast. He reports that on the east end of the claim there is a large outcrop of compact quartzite in which lead is said to have been obtained, but he only saw specks of lead, zinc, and specular iron, not warranting expenditure in sinking. A mile and a half distant, on the western bank of the river, there is an excellent show of galena and carbonate of lead near the surface, on which costeeing has been done. Samples taken from the west end of the claim show the ore to be worth 52 per cent. for lead and 8ozs. silver to the ton; but there is no great quantity in sight. Too much money has been spent in surface work, and the main end of the claim is still unproved. (1889.)

**WHEAL COGLIN MINE** is forty-eight miles S.W. of Adelaide and three miles from Rapid Bay. Several shafts were sunk from 7 to 35 fathoms in depth. About 70 tons of ore were shipped to England and sold at about £14 per ton. The lodes ranged from 6in. to 2ft. in width, and consisted of barytes, gossan, and silver-lead of good quality. (1887.) No recent records.

**WHEAL ELLEN SILVER LEAD MINE** is situated on 25 acres of section 2728, in the hundred of Strathalbyn, about 80 miles from Adelaide. It was opened in 1857, was in active operation in 1860, and was worked for some time, and then lay idle for many years. The following account is compiled from papers supplied by Mr. John Harvey:—The mine is situated on top of a hill 40 fathoms above the bed of the creek. The lode on the back is carbonate of lead for many fathoms in length, and rich in silver. It is from 4ft. to 5ft. wide on the average, and underlaying to the east about 2½ft. to 3ft. in the fathom; the shoots of ore dip north. The ground about the lode is soft white slate, a mixture of clay and mica, and very soft for working. Five shafts have been sunk, namely—Main Shaft, McCourt's Shaft, New Shaft, Corkscrew Shaft, and North Shaft. Three of them are sunk to depths of 20 fathoms, 60 fathoms, 40 fathoms, and a number of drives and levels have been put in. About £35,000 was expended on the mine up to the close of the year 1859, of which not more than one-half was for underground work, the remainder of the sum being represented by the purchase and improvement of the property and the building of smelting furnaces, miners' dwellings, machinery, &c. The proceeds, during the same period, amounted to a net value in England of £20,000. The lode in the 40-fathom level in New Shaft averaged about 2½ft. wide, and was composed of galena and zinc blende ores. Ores found in other shafts and workings were galena, zinc blende, mundic, auriferous gossan and carbonate of lead; also stains of blue and green carbonate of copper. In the North shaft, at a depth of 25 fathoms, a branch of rich copper ore, about 3in. wide, was met with, and at 26 fathoms the width increased to 10in., and consisted of red oxide, black oxide, and grey copper ores. During eighteen months' work about 2,000 tons of lead ore were raised, and yielded 90,000ozs. of silver. Specimens of the auriferous gossan, assayed by Messrs. Johnson & Sons, London, yielded gold at the rate of 4ozs. per ton, silver 45½ozs. per ton, and 59 per cent. of lead. The country rock consists of mica schist, micaceous sandstone, and quartzite. The Inspector of Mines reported upon it at the end of last year, stating that thousands of pounds must have been spent upon it in former years, but though there were raised during one term of eighteen months 2,000 tons of ore that yielded on an average 45ozs. silver to the ton, the smelting appliances were so defective that great loss of metal must have been sustained. A piece of lead with slag attached, picked up from the slag heap, produced when tried by the Government Assayer 5ozs. 9dwts. of gold and 269ozs. of silver per ton and 96 per cent. of lead. The lode has been opened up about 1,000ft. on its course, and hundreds of feet of drives exist in levels from the 10 to the 60 fathoms. A gossan lode, 2ft. wide, shows in Spence's Shaft, which is kindly in character and yields fair prospects for gold. The lode in Bassett's Shaft, at the 50 fathoms level, holds a large block that would pay for working, and it is composed of quartz, cubical and antimonial galena, and sometimes zinc. The hanging portion of

the lode resembles the Aclare ore. The main portion of the lode in this part of the mine has probably not been cut. The auriferous nature of the whole of the lode formation is an important feature. The mine is comparatively untried. It is understood that operations may soon be resumed, when, by sinking the shafts and opening new levels, and providing dressing machinery suiting the nature of the ores, good returns may be hoped for. Galena from the 50 fathoms level assayed 40 per cent. lead and 24ozs. 13dwts. silver per ton. Gossan and ironstone gave gold as well as silver.

**WHEAL EMMA.**—No records obtainable.

**WHEAL GAWLER MINE**, Glen Osmond, adjoining the Wheal Watkins on the north, was the first mine opened in the province of South Australia. On account of the discovery of rich specimens of galena on the surface, the land was purchased and mined. Work was started in May, 1841, and several tons of very pure galena were raised. From a trial made at Governor and Company's Smelt Mills, England, the yield was, dressed ore 77 per cent. lead and 19ozs. 4dwts. 4grs. silver per ton; undressed, 61½ per cent. lead and 19ozs. 2dwts. 4grs. silver per ton. In 1848, an assay made by C. E. Schonne, Calcutta, of 107 slabs of bullion sent from the smelting works, Glen Osmond, yielded at the rate of 35ozs. silver to the ton, and one small one went as high as 70ozs. to the ton. The 107 slabs were the produce of the common carbonates, and the small slab was from the average ores. (1887.)

**WHEAL GRAINGER**, five miles S.E. of Adelaide.—No records obtainable.

**WHEAL MARGARET MINE** is in the Mount Barker District, and was originally leased from the Paringa Mining Company, in 1848. It appears to have been worked up to the outbreak of the Victorian goldfields, in 1851. In the old workings it is apparent that a large bunch of ore was taken from about the 7-fathoms to the 15-fathoms level. At this point the lode was contracted to about 1ft. in width by a "horse" of exceedingly hard quartz. There is no record of the amount of ore raised during the first working of the mine. Work was resumed for about six months in a later year under the direction of Captain Price. The following is from notes supplied by Captain Price:—There are three lodes, bearing from N. 10° E. to N. 5° W., and having an underlay of from 18in. to 2ft. in the fathom easterly; widths varying from 2ft. to 12ft., and the ores composed of galena mixed with zinc blende, and occasionally small strings of copper ore. The veinstone associated with the metallic minerals is a flinty and very hard quartz, together with a flucan of chlorite on the hanging wall, with some veins of copper. The country rock is metamorphic slate. The ore, when properly dressed, will assay from 50 per cent. to 60 per cent. of lead, and 52ozs. to 80ozs. of silver to the ton. Thirty-five tons of ore yielded, on assay, from 45ozs. to 55ozs. of silver to the ton. Three shafts, the deepest being 15 fathoms, have been sunk to the water level, and the drives and levels extend about 200ft. The ore occurs in shoots and small veins of about 3in. thick. Parliamentary Paper No. 83 of 1860, states that Mr. Jno. B. Neales first smelted lead by the Cumberland process at this mine in 1850. The first stampers used in the colony were erected on this property, and the first colonial-made pumps and lifters were used to keep the water under. (1887.)

**WHEAL MARY.**—An old silver-lead mine near Normanville. There are several shafts along a north and south line. In one or two places there is a little galena in calc spar. There is also some gossany iron ore in the limestone, apparently in cavities. The bedrock is composed of limestone. (August, 1886.)

**WHEAL RODGERS.**—A claim three or four miles north-west of Blinman, upon which a ferro-calcite and limestone outcrop is being prospected, and a yellow earthy gossan, with brown iron ore and manganese, is being raised. (1889.)

**WHEAL ROSE MINE** was amalgamated with the Wheal Margaret.

**WHEAL TYRELL PROSPECTING COMPANY.**—Property near Winnowie. Two shafts sunk near an iron ore "blow"; not informed of any satisfactory result. (1888.)

**WHEAL WATKINS MINE** is near Glen Osmond, four miles from Adelaide; freehold section 919, hundred of Adelaide, adjoining the Glen Osmond Union Mining Company's property. It was opened in 1843, and remained steadily productive until the year of the Victorian diggings (1851). The Government Geologist examined this mine in September, 1888, and described the lode as having a general strike of about E.  $10^{\circ}$  S., and underlying north  $70^{\circ}$  to  $80^{\circ}$ . A very large amount of work was done in earlier years, and the upper portions of the lodes appear to have been worked out. The total depth of the main shaft is said to be 480ft.; but at that date the workings had not been cleared out beyond the depth of 255ft. The country rocks are clay and calcareous slates, and limestone, having a low dip of  $10^{\circ}$  to  $15^{\circ}$  south and south-east, traversed by a fault in which the lode has been deposited, and which is likely to continue in depth, and contain rich patches or shoots of ore. There are other lodes, such as Fink's, Gore's, &c., which have not been developed. Assays by the Government Assayer:—(1) Galena and gossan from winze east of shaft, 40-fathom level, silver, 20ozs. 2dwts. per ton, and 67 per cent. lead; (2) from stopes 49 fathoms west, silver 22ozs. 4dwts., and 67 per cent.; (3) 22ozs. 17dwts., and 57 per cent.; (4) galena and gossan from stopes 40-fathom level west, silver 15ozs. 14dwts., lead 55 per cent. Average of silver, 20ozs. 4dwts. per ton; lead,  $61\frac{1}{2}$  per cent.

**WHEELBARROW RANGE.**—Near to Farrell's Flat there is an old shaft which has been sunk on a quartz vein containing galena to a depth of about 30ft. An assay of the galena returned silver at the rate of 7ozs. per ton. The vein is small, but worth prospecting to a depth of 50ft. or 60ft. on the underlay. Prospecting has been done along the same line for a distance northward of about a mile; but, beyond traces of galena, nothing has been found worth mentioning, nor are the prospects such as to induce anyone to continue. (Inspector of Mines, 1889.)

**WICKLOW HUT**, near Franklin Harbor.—A shaft has been sunk to a depth of about 30ft. on a decomposed granite dyke 3ft. or 4ft. wide. Thin galena veins have been cut, and can be easily worked, as the rock is soft. Assays made by the Government Assayer gave—Galena (1) per ton, 1oz. 6dwts. 3grs. of silver; (2) 1oz. 6dwts. 3 grs.; (3) 1oz. 9dwts. 9grs. (1887.)

**WILPENA.**—About two miles N.E. of Wilpena eatinghouse, fifty-eight miles N.E. of Hawker railway station, a mineral discovery was made some years ago. It was represented by a well-defined quartz reef from 2ft. to 4ft. thick. The crystalline quartz of the main portion of this reef is full of thin strings and small patches of galena; some of the patches are several cubic inches in size, and in some places partially converted into carbonate of lead. This reef should be thoroughly examined, because lodes similarly composed at the outcrop have frequently been found to carry more valuable ores lower down, such as bournonite and tetrahedrite. (Ulrich.) This lode is probably the same as the one in which silver-lead ore has recently been found.

**WINNOWIE CONSOLIDATED MINE.**—Situated near the Ediacara, and, in the opinion of the Inspector of Mines, worthy of being thoroughly prospected. (1889.)

**WIRRIALPA.**—A discovery of silver-lead ore was some time ago made adjoining the Wirrialsa Mine, twenty miles east of Blinman, and six miles north of Wirrialsa station. Captain W. H. James, of Blinman, considered it a most important discovery, and stated that he had traced the outcrop for a distance of from three to four miles in a direct line. In places quantities of galena and carbonate of lead are

visible. (1887.) This mine belongs to the South Australian Mining and Smelting Company, and is under the same management as the Blinman mine. At the surface galena shows in veins traversing the soft ground, and passes into a crystalline limestone, in which it fills irregular cavities, and forms large masses, each several tons weight. This main lode strikes in a north-westerly direction, and is crossed by another in which baryta is associated with galena and carbonate of lead. A vertical shaft has been sunk 120ft., and at 60ft. both lodes are being driven upon. Though the galena occurs irregularly in the limestone, still it has every appearance of continuing in depth and yielding a good supply of ore. Several other shafts have been sunk on veins of galena and on iron ore with copper. The ore raised is estimated at 60 tons, averaging 70 per cent. of lead and 50zs. to 80zs. of silver per ton. The geological formation is the same as that at Blinman, and similar dykes of igneous rock have tilted up the strata, which in many places are twisted and contorted, and vary in dip from horizontal to vertical. It is likely that metalliferous deposits will be found at the junction of the igneous dykes and the stratified rocks. The Inspector of Mines reports, after a recent visit (1889), that the surface prospects exhibit galena in ironstone, baryta, and calcspar. There is an underlay shaft going down 50ft. The lode formation is regular, and its constituents are ironstone, quartz, and limestone. A vertical shaft put down 73ft. was not deep enough to strike the lode, but was continued on an underlie 56ft. on what appeared to be lode formation. The locality is favorable, and the mine is well situated, but only large deposits of mineral can be worked at a profit, because of the low value of the ore found in the vicinity and the distance from a market. A favorable feature is the entire absence of minerals of a refractory nature. In depth the lead is several ounces per ton better value for silver than at the surface, and the ground is cheaper to work. On the surface large quantities of lead can be seen in the outcrops. A great deal of work has been done, and a large quantity of machinery has been placed on the mine, and smelters have been erected. Taking all things into consideration, the mine has been opened up at moderate cost, and there is a promise of its becoming remunerative. [Fuller reports have been received from the legal manager, but were too late for insertion.]

**WOLSELEY MINE.**—Near the Beltana prospecting ventures in the Mount Serle district. No particulars to hand.

**YATTAGOLINGA MINE.**—(See PHILLIPS' MINE.)

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## BISMUTH.

BALHANNAH MINE.—(See under GOLD).

**MOUNT MACDONALD MINE.**—Locality, Freeling Heights, north-east of Yudnamutana. There are four lodes, striking east and west, only one being worked upon at present. Three shallow shafts have been put down, following the dip of the lode. The lode, which is 9ft. wide, without discovery of walls yet, contains oxide and carbonate of bismuth, associated with carbonate of copper. Yield of bismuth, 19 per cent. to 60 per cent., and of copper, 20 per cent.—(A. Frost.) The secretary informs us that three bags of ore weighing 4cwt. 1qr., which were forwarded through Messrs. Harrold Bros. to the Royal Works, at Oberschelma, realized 500 marks, say equal to £24 10s.

**MURNINNIE MINE**, containing bismuth and copper, is situated on the western shore of Spencer's Gulf, six miles inland. It is sixty-four miles south of Port Augusta, and 136 miles north of Port Lincoln. There are five lodes bearing north and south, with little underlay. In width they vary from 1ft. to 10ft., and the ores they contain are bismuth, copper, nickel, silver, and cobalt. The percentage of bismuth varies from 18 to 79 per cent., copper 10 to 20 per cent. The country rocks consist of quartz, ironstone, and decomposed slate, and hard slate. Near the adit in the gully there is a little granite. Six shafts have been sunk, one to the depth of 30 fathoms, and two drives have been put in a distance of about 100ft. each. About 1,000 tons of ore have been raised, which is stated to be worth about £44 per ton in its natural state. The first indications of ore were found in a large block on the surface. The lode was then followed down for 12 fathoms at an angle of 45°, and at that depth a pocket was found containing 60 tons of ore. The winze below the pocket carried a lode 5ft. wide for a distance of 10 fathoms, then came a shoot of about 40 tons.

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## COBALT AND NICKEL.

Both these metals occur associated with gold in ferro-calcite veins at NICHOL'S NOB, near Mount Lyndhurst. The minerals containing them include smaltite (composition: nickel, cobalt, and arsenic), gersdorffite (nickel, sulphur, and arsenic), and erythrite (oxide of cobalt and arsenic).

Ullmanite (composition: nickel, antimony, and sulphur) occurs at GILL'S BLUFF, near Mount Lyndhurst, and thirty-six miles S.E. of Farina railway station, in thin veins of ferro-calcite traversing hard calcareous flags. On being analysed it was found to contain a fair percentage of nickel. An assay by Mr. G. Goyder, jun., gave:—Nickel, 24 per cent.; antimony, 54 per cent. None of these veins have yet been found of sufficient size to be worked profitably. (1888.)

**CARTOPE CREEK**, near the Burra.—Some mineral leases have been taken up here to search for cobalt. Several shallow tunnels and holes have been put in soft argillaceous and kaolinized sandstone, with limestone bands. The strike is north and south. (1887.)

Cobalt has also been searched for at Gum Creek, near the Burra, and is found elsewhere in many of the manganese ores, but not in payable quantities.

COBALT discovery near Willowie, three miles north of Mount Remarkable, which has not been worked. (Conservator of Forests.)

FLINDERS RANGE COBALT, NICKEL, SILVER, AND COPPER MINE.—This is a mineral licence for 80 acres, two miles from Blinman Mine, where there are six lodes, two striking north and south, and four east and west, of varying widths up to 10ft. and 11ft. A shaft 35ft. deep follows the dip of the lode, and there is a drive put in north 18ft. The lodes yield by analysis cobalt, nickel, silver, copper, and a small quantity of gold. The north and south lode yields about two tons per fathom, and the east and west lode three tons. (Captain Doble, Blinman, 1890.)

LOBETHAL.—Within half a mile of this township (twenty-seven and a half miles east of Adelaide), a mine of cobalt and silver is said to exist. The lode runs north and south, and is composed of iron, gossan, quartz, and mundic. (1867.)

MOUNT MACDONALD.—(See "BISMUTH.")

MOUNT OGILVIE WEST.—The ore here is said to carry  $4\frac{1}{2}$  per cent. of nickel, a half per cent. of bismuth, and a trace of cobalt.

YOUNG'S COBALT CLAIMS.—These are situated near the township of South Blinman, between the Blinman and the Wheal Friendship Mines. The Inspector of Mines states that he examined the claims on the 18th February, 1890, and found several tons of ore at grass; cobalt, ditto, with silver and copper. The outcrops of lodes show copper intermixed with iron and quartz, the cobalt being found in nodules near the intersection of two lodes, the ore—erythrite arseniate of cobalt—being seen in each. It is of peach-red color, varying to greenish grey. This form of ore is the result of decomposition of other cobalt ores, and suggests the possibility that this mineral will carry down to depth. One per cent. cobalt ore would pay well, and the samples from ores at grass assayed at the rate of 6 per cent. cobalt and 12 per cent. copper. On these claims there are also several good copper prospects, and silver has also been found. A full assay has been furnished by the Government Assayer: No. 1 sample,  $6\frac{1}{2}$  per cent. copper, 11.72 per cent. cobalt, 2ozs. 12dwts. silver per ton; (2) 28 per cent. copper, 1.46 per cent. cobalt, 6 per cent. nickel; (3)  $14\frac{1}{2}$  per cent. copper, 1.15 per cent. cobalt, 3ozs. 5dwts. silver per ton; (4)  $7\frac{1}{2}$  per cent. copper, 4.89 per cent. cobalt. The presence of nickel in No. 2 sample adds considerable value to the ore, the present American price being \$2.75 per lb.

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## GOLD.

AJAX GOLD MINING COMPANY.—(See NEW AJAX.)

ALGEBUCKINA GOLD DIGGINGS.—(See PEAKE.)

**ALMA AND VICTORIA GOLD MINE.**—This important mine is situated sixteen miles west of Teetulpa Goldfield, in the Waukaringa district. It is said that it was the discovery of a shepherd, about 1872. Several companies were floated, but they all subsequently collapsed, save the one under consideration. The primary cause of the successive abandonments was the scarcity of water and the expense of cartage. On this mine a very large sum of money has been spent in development and experiments in the extraction of gold from its matrix. Up to the 31st March in the current year it is estimated that £142,884 17s. 11d. had been spent on the mine, including £124,375 12s. 10d. paid for wages and materials and working expenses, and £18,509 5s. 1d. on plant, machinery, and buildings; and the quantity of gold obtained was 22,917oz. 1dwt., valued at £91,747 5s. 4d. The management speak hopefully of the future of the mine. There are four lodes upon the property, having a strike of about 15° north of east, and underlying south about 30°, with an average width of 5ft. Water level was reached at 160ft. The ore consists of arsenical pyrites, associated with carbonate of lime and quartz, and occurs in shoots and patches, and the gold is so coated with pyrites as to be undistinguishable. Recently the Government Geologist inspected this mine from the surface to the bottom of the workings, about 600ft. on the underlie, when a large reef of pyrites was being stoped underhand. To avoid the disadvantage of working in this manner a new main vertical shaft is now in progress. The treatment adopted for the extraction of gold is as follows:—The crushed ore is run from the stamps into Denny pans, which are used as concentrators, no quicksilver being placed in them. When these pans have run for some time the heavy pyrites and gold left behind (the fine pyrites and slime having been washed away into settling pits) are taken out, roasted, and amalgamated in a Denny pan. Tailings belonging to previous crushings are also passed through at the same time. Samples of the waste tailings from the pans taken by him assayed on the average 1dwt. 8gr. of gold per ton, showing that at the time there was very little loss of gold, and that the concentration was as perfect as need be. It also showed that the ore, which is chiefly pyrites, is not difficult to treat. Specimens of the pyrites from the bottom of the mine were taken at the same time and found to contain gold at the rate of 8 dwt. and 17 dwt. per ton. The Inspector of Mines says that this mine is a very important one, employs on an average 140 hands, and the plant is reducing 300 tons of stone per week. Rock-drills are to be used, and the company propose to increase their crushing power 50 per cent., a course fully warranted by the quantity of stone in sight. The manager, Mr. Hosking, states that there are two east and west lodes, with a southern underlay of about 32°; the north lode 7ft. and the south lode 2ft. 6in. wide. There are twelve shafts, the two deepest being 1,180ft. and 260ft., and five of these shafts follow the dip of the lode. There are about 6,000ft. of drives in the mine. The matrix is composed of quartz and calcspar, and the country of sandstone, with occasional veins of slate. The ore raised consists of nearly pure sulphides, and the yield during the past six months (to April 1890) has averaged 15 dwts. 7 grs. per ton, the gold being worth £4 2s. 8d. per oz.

**ALMA EXTENDED.**—Locality, Waukaringa, west of the Alma and Victoria Gold Mine. There are three lodes upon the property, with an east and west strike, one being 3ft. wide, the second averaging 3ft., and the third 5ft. wide. One shaft has been put down vertically to a depth of 470ft., and 390ft. of driving has been done. The matrix of the gold consists of iron pyrites and quartz. The company is erecting a 20-head battery, and putting up concentrators. Assays made from time to time

have given very satisfactory results. The Inspector of Mines reports favorably, and gives as the assay of a sample by the Government Assayer 2oz. 2dwt. of gold and 3dwt. of silver to the ton. A quantity of ore is at grass awaiting treatment, and crushing will be started at the beginning of June, when good results are expected. The plant and construction expenditure on this property to the end of February last amounted to £8,819 10s. 10d., and wages and materials account reached £9,487 17s. 1d.; total expenditure, £18,307 7s. 11d. (1890.)

**ANGASTON GOLD AND SILVER MINING SYNDICATE.**—Property, section 306, and part 339, hundred of Moorooroo, known as Sibley's. No information.

**AUBURN GOLD MINING COMPANY.**—(See BAROSSA GOLD REEFS).

**AUSTRAL GOLD MINING COMPANY.**—Eighteen quartz claims near Mannahill, formerly known as the Birthday Reef. No information.

**BALHANNAH MINE** is on section 4024, hundred of Onkaparinga, and is distant from Adelaide fourteen miles, E.S.E. There is no information obtainable touching the early history of this mine. Local traditions agree in stating that it is rich in bismuth, gold, and copper, and large quantities of the first and last-named metals were got. An examination of the spoil left on the surface, and tested by washing, showed gold to be present; and it is probable that rich shoots of that metal were met with when the mine was being worked. Alluvial gold is also to be met with in the immediate neighborhood. Specimens of bismuth ore are easily to be obtained from the refuse heaps, and copper ores of all kinds are abundant. The veinstone consists, near the surface, of gossan, iron ore, and quartz; lower down, of quartz, with carbonates of iron and lime, and pyrites. Two reefs have been worked. They strike north and south on the surface. The country rocks consist of kaolinized slate and argillaceous sandstone, striking N. 10° to 15° W., and dipping E. about 60°.

Mr. J. B. Austin has contributed the following note:—

The mine was first worked for copper, of which a considerable quantity was obtained near the surface. Bismuth was found associated with the copper, and the quantity increased, until it appeared likely to prove more valuable than the copper. Gold was found in the bismuth, and some beautiful specimens of small nuggets of pure gold in native bismuth were met with, the precious metal being in the proportion of five ounces of gold to one hundredweight of bismuth. Cobalt in small quantities, also antimony and plumbago, are said to have been found in this remarkable mine. The workings were carried down to a depth of 50 fathoms, where there is a wide but dredgy lode, yielding about one ton of bismuth to the fathom, with some copper and gold. From £25,000 to £30,000 worth of copper was raised from this mine, and about £7,000 worth of bismuth. Some exceedingly rich specimens of gold in ironstone gossan were obtained, and several nuggets, the largest weighing about 2½oz. A considerable quantity of white carbonate of iron is also found.

The workings consist of a main shaft 300ft. deep, and two others to the westward. One of these has been sunk to a depth of 50ft., and the other to 120ft. The water in the main shaft makes at the rate of 8,000 gallons per hour. Levels have been put in at 60ft., 120ft., and 240ft. Several drives and stopes have been made from these levels. In the old workings the lode seems to have been very broken; but at the bottom drive, extending 150ft. eastward from the main shaft, the country seemed to be more settled. (1887.)

**BANKSIA MINE.**—This property is now denominated the New Banksia, and is situated on section 4261, hundred of Onkaparinga, near Oakbank. Gold has been obtained from a series of more or less parallel leaders, striking N.E. and S.W., and dipping S.W. 45°, through metamorphic, granitic, and argillaceous rocks associated with granite. The veinstone consists of quartz, cellular and ferruginous iron oxide, and micaceous iron. There is one shaft sunk to a depth of about 80ft. Fifteen tons of stone yielded about 11dwts. of gold per ton. Mr. J. C. F. Johnson states that a small crushing of nine tons gave 9ozs. 6dwts. of gold, and that assays of pyrites from

the same claim have given as high as 10ozs. per ton. The Inspector of Mines reports an examination of this mine recently, and states that there are a series of parallel leaders striking nearly east and west, with a southern dip. Four of these have been opened upon by means of shallow shafts. There is also a large ironstone reef cutting these at right angles, and striking north and south, with a dip at a low angle to the east. The strata are composed of metamorphic and argillaceous rocks, with granite. The matrices are quartz, cellular iron, oxide, micaceous iron, and iron pyrites, the latter assaying very high for gold. Assays of samples taken by the Inspector to the Government Assayer gave—(1) pyrites, 3ozs. 9dwt. of gold to the ton; (2) ditto, 2oz. 10dwt.; (3) north and south lode, 1oz. 4dwt.; (4) 6oz. 17dwt.; (5) quartz, 8dwt. In the former working of this mine, 10 tons crushed at New Era Mine yielded 23dwt per ton; 13 tons crushed at Two-in-the-Bush Mine yielded 13dwt., and 25 tons 16dwt. and another 25 tons 17dwt. per ton; 8 tons crushed at the Bird-in-Hand Mine gave 19dwt. per ton; 25 tons treated at the Eureka Mine gave 14dwt. per ton, and 30 tons 10½dwt. per ton; 5 tons treated at Sandhurst, Victoria, gave 18dwt. per ton. The total of 141 tons yielded 106oz. 11dwts. of gold, the average being over 15dwt. per ton, and the value of the gold was £3 18s. 10½d. per oz. In these trials no effort was made to deal with the pyrites, and assays prove that they carry the bulk of the gold. The ground is easy and cheap to work, and seven of the lodes have been proved to be gold-bearing. (1889.)

### BAROSSA GOLDFIELD.

This goldfield is situated in the south-west corner of the hundred of Barossa, distant from Adelaide about twenty-two miles and three miles from Gawler. The field was discovered in 1868 in the gully now known as Spike Gully, which is one and a half miles long—the prospector's claims being near the centre. The depth of sinking was from 5ft. to 20ft. Some of the claims were very rich, yielding as much as £1,000 per man. The rocks of the district are supposed to be of lower Silurian age, from their lithological resemblance to those of the Victorian goldfields; but from their highly metamorphic appearance, and the fact that no fossils have been found, it is impossible to say decidedly of what age they are. In several places intrusive granite dykes are met with, and in one particular line, from Malcolm's Creek to Mount Gawler, they are very frequent. These rocks consist of metamorphic, argillaceous, and micaceous schists, sandstones and grits, granite, gneiss, hornblend schists, mica schists, and quartzite, with granite, greenstone, and feldspathic dykes. As a rule they have a uniform strike of about 20° east of north, and dip to the eastward from 35° to 70°. There is an exception to this rule near the Bismarck diggings, where the dip is 70° in two places, probably caused by local agency, as it does not extend far. (1887.)

**BAROSSA DEEP LEADS** were the richest diggings then discovered in South Australia; they are situated at the head and down the side of Spike Gully. The following are some of the most important:—

**COTTIER'S HILL LEAD** crosses Moonta Gully and Moonta Hill, in the direction of Yetti Creek. It started from the surface, going down into deep ground in ledges. There it was rich, yielding as much as 8ozs. to 9ozs. to the tub; but it gradually became poorer as it crossed the gully, and did not pay to work far into the Moonta Hill.

**EDWARDS' RUSH.**—Two or three claims paid very well; but as the washdirt was cemented, it had to be crushed.

**GODDARD'S HILL** is on a spur between Nuggety and Gollop's Gully. The lead splits in two, one point coming down the point of the hill, whilst the other goes into Gollop's Gully.

**GREEN HILL LEAD**, on the ridge between Green Hill Gully and Spike Gully, runs in a north-easterly direction into the Red Hill.

**HITCHER'S HILL LEAD**, or Deep Lead, is a continuation of Victoria Hill Lead, but not so rich, though it paid very well down to Water Flat, where there are some springs. Here the lead was lost, but lower down, where it ran into Walkervale Gully, it was again payable for a short distance. The deepest sinking—120ft.—was on the ridge at the head of Spike Gully.

**MELVILLE'S RUSH** is situated about one mile from Williamstown. It starts on the main ridge, and winds down a small spur in the direction of Victoria Creek. The sinking was very hard, and the depth ranged from 15ft. to 20ft. All the washdirt had to be crushed, and, except in the case of one or two claims, did not pay well.

**RED HILL LEAD**, between Two-Speck and Nuggety Gullies, is a continuation of Simmons' and White Leads.

**SIMMONS' LEAD** lies between the heads of Spike Gully and Two-Speck Gully; evidently a continuation of White Lead.

**VICTORIA HILL**, south-east of Spike Gully. The sinking was from 70ft. to 80ft. in depth, and as much as 11oz. 14dwts. of gold has been taken off the bottom of the shaft, the largest piece of gold being 7oz. in weight. The Inspector of Mines expresses the opinion that the reefs will probably become gold-bearing in depth to a payable degree, but at present they are not continuous or regular. There has not been any systematic mining, though work has been carried on for years.

**WHITE LEAD** is situated between the head of Spike Gully and the road, and is cut through by several small gullies. The sinking was very hard, being nearly all through cement, with layers of sand between; and as the washdirt was also cemented, batteries had to be erected for crushing. Some of the cement yielded as high as 13oz. to 14oz. to the ton. The depth of sinking varied from 5ft. to 60ft., according as the shafts were situated either on the top of a spur or near the edge of one of the small gullies. The thickness of the washdirt varied from 2in. to 8in.

In **PARA WIRRA** very little has been done in prospecting deep leads, and the **BISMARCK** is the only one that has been worked. This claim is situated on the north side of Devil's Gully. The lead runs in a northerly direction, crossing several small spurs and gullies; but only one carried gold. The sinking was very hard, being mostly cement. The claim never proved payable, although some small nuggets were found of from 1dwt. to 1oz. in weight. (1887.)

The alluvial diggings of this goldfield are very limited in extent, and seem generally to have derived their gold from the deep leads which they cut through. The most important on the Barossa side are:—

**BULLOCKY GULLY** was thoroughly worked, but was not payable.

**GOLLOP'S GULLY** was also very rich at the part where it spreads out into a little flat.

**GREEN HILL GULLY** paid to work for the distance of a few chains below Green Hill Lead.

**HAMLIN'S GULLY** was rich immediately below the Lady Alice reef. The gold was large and rough, and the largest nugget found weighed 3ozs.

**HISSEY'S GULLY** paid very well, although most of the washdirt had to be crushed. The depth of the sinking was from 15ft. to 30ft.

**MARY'S GULLY**.—A number of holes were sunk, but nothing payable was found.

**MOONTA GULLY** paid very well.

**NUGGETY GULLY** was very payable, and yielded nuggets up to 1oz. in weight.

**SPIKE GULLY**, where gold was first discovered in soft ground at a depth of from

5ft. to 20ft. The gold was nuggety, ragged, and smooth. Some of the claims were very rich, a single one having yielded as much as £1,000.

**TWO-SPECK GULLY** paid to work from Spike Gully to Green Hill.

There are two or three other places, such as Vixen's and Devil's Gullies, and at the diggings on the east side of Mount Gawler, where small quantities of gold have been found.

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**SIM'S RUSH.**—Early in 1887 a fresh discovery of alluvial gold was made on sections Nos. 574 and 1103, near the junction of Spike Gully and Yetti Creek. The gold was found in ordinary alluvium, increasing in depth to the northward, and also in an old lead, being a continuation of that which was previously worked between Yetti Creek and Spike Gully. Some of the claims have been sunk to a depth of 25ft., but great difficulty was experienced owing to the strong influx of water. An extension of the lead may be looked for to the northward, where the surface indicates an area of similar "made" ground. Patches of this are found on many of the hills in the neighborhood. The trend of the newer or alluvial lead, worked in Sim's paddock, is probably down the Yetti Creek into the South Para River. It is impossible to state the amount of gold obtained from these diggings, owing to the reticence of the miners and the owners of the property. The rocks of the neighborhood are white kaolinized clay slates, quartzose sandstones, and metamorphic granite.

### BAROSSA GOLD REEFS.

A good deal of work has been done on these reefs, though with little success. In some instances this has been due to want of system; in others, where the prospects were good, the enterprise has been abandoned for some unknown reason; and in other instances again, payable shoots of gold have been left, and vertical shafts have been sunk, striking the reef in a barren part.

**AUBURN GOLD MINING COMPANY.**—Some claims were taken up on Goddard's Hill, where a shaft was sunk 110ft. At 60ft. it passed through some gold-bearing leaders, but these were not followed.

A shaft was sunk in 1869, by Mr. Gilbert, between Two-Speck and Nuggety Gully, to a depth of 80ft. or 90ft., but no gold was obtained.

**BAROSSA.**—The first auriferous reef found here was Moonta Hill, which, as far as worked, was not payable.

**BAROSSA DEEP LEADS.**—(See BAROSSA GOLDFIELD.)

**BREAKELL & COMPANY**, in 1882, put a tunnel 80ft. in length into Goddard's Hill, but got nothing. In 1882 they extended the tunnel to a length of 500ft.; they sank a shaft on Cotter's Hill to a depth of 100ft., and in driving to the west cut a flat reef 9ft. thick; but in neither case was gold obtained.

**MALCOLM'S BAROSSA GOLD MINE** was discovered in 1871. It had a large vertical sandstone reef, about 15ft. wide, with small leaders of quartz. The main shaft was sunk 200ft., and at 80ft. a leader carrying gold and 20 per cent. of copper was struck. At the bottom of the main shaft a 200ft. drive was put in to the east, and a reef, non-gold bearing, was cut. Another shaft to the south of the main shaft was sunk 150ft.

**RED HILL GOLD MINING COMPANY.**—In the same year, this proprietary sank a shaft 120ft. on a vertical reef. At 70ft. they got good prospects and sent a crushing to Adelaide, but the returns were not so good as had been expected, and the mine was stopped. In 1882 the ground was again taken up. Three shafts, of depths ranging from 60ft. to 70ft., were sunk, but without successful results.

**ROSEMAN & COMPANY,** in 1882, took up some claims in Gollop's Gully, and opened out on a reef between 3ft. or 4ft. in thickness. They also sank a shaft 40ft. on the same reef, and took out a crushing, but it was not payable.

**VICTORIA GOLD MINE** was taken up in 1884. From stone found on the surface, and crushed in a mortar, 35ozs. of gold were obtained. The reef was followed down 40ft.; a vertical shaft was sunk 150ft. to the east, but failed to cut it. A drive to the east through very hard ground was, in 1886, put in to meet it. There are two reefs, one striking almost due north, and the other north-east; both dip to the east. The prospects washed from stone taken from the reef were very good, and proved that it was worthy of being tested in a systematic manner. The rocks are feldspathic slates and schists, sandstone, quartzite, and grit. In an official return made in 1871 by Mr. W. J. Peterswald, Warden of Goldfields, the value of gold found on this field, from 1868 to 1871 is estimated at £95,000. A return made by Mr. A. W. Woods of the English, Scottish, and Australian Chartered Bank, and published in one of the daily papers, states the amount of gold bought by that Bank from October, 1868 to June 30th, 1870, was 5,252ozs. 4dwts. 7grs. The price paid was at the rate of £3 17s. per ounce, and the total value represented was £20,221 0s. 6d. No recent information.

**BAUM'S GOLD MINING COMPANY** held a twenty-eight years' lease of portions of section 64, Forest Range, hundred of Onkaparinga, containing ninety-five acres. No records.

**BENDLEBY MINE.**—Mineral claims 16371-4, in the hundred of Bendleby. A quartz leader was followed down 50ft., the matrix copper-stained, but lode poor. North of the shaft is a strong quartz outcrop traceable for miles, and likely to carry gold, but nothing has been found.

**BEN LOMOND.**—(See TREETULPA.)

**BERTRAM'S REEF.**—(See ECHUNGA.)

**BIG BEN.**—(See ECHUNGA.)

**BIG BLOW MINE,** situated about four miles north-east of Outalpa sheep station. Area 80 acres. There are two rugged outcrops of conglomerate. Sample from depth of 20ft. contained no mineral; the surface quartz and pyrites yielded 16 grains of gold per ton. (Inspector of Mines, 1889.)

**BILLY SPRINGS** are seventy-two miles east of Farina. About one mile south of the springs some digging has been done in shallow ground, having a limestone bottom, strewn with quartz wash from a large reef a little to the east. Gold has been found here. The samples seen in 1884 were coarse and rough, and showed no signs of being waterworn.

**BIRD-IN-HAND MINE.**—(See WOODSIDE.)

**BIRD-IN-HAND EXTENDED MINE.**—(See WOODSIDE.)



**BIRTHDAY REEF.**—(See MANNAHILL.)

**BISMARCK MINE.**—(See PARA WIERA.)

**BISMARCK PROSPECTING CLAIM.**—An amalgamation of four claims, now included in the New Mingary. The Bismark shaft is 50ft. deep, and is sunk perpendicularly on a quartz vein in which, not far from the surface, coarse gold can be seen. The vein occurs in a solid hornblendic rock resembling amphybolite. In Strawbridge's shaft the reef is over 4ft. wide. The quartz contains carbonate of copper and gossan, and fine gold can be obtained by crushing and washing. (1889.)

**BLACKFELLOWS' CREEK DIGGINGS** were discovered about the 1st March, 1887. They are situated on section No. 292, hundred of Kuitpo, and about half a mile above the junction of Blackfellow's Creek and the River Finniss, on an alluvial flat on the creek. The sinking varies from 8ft. to 10ft. in depth, and is wet. The gold found was fine. There are wide alluvial flats, and a large extent of Crown lands available for prospecting purposes.

**BLACKFELLOWS' REEF** is in the Waukaranga district. This claim is said to have yielded the coarsest gold yet found in this locality. The vein is very thin, and consists of quartz with carbonate of iron, iron pyrites, and oxide of iron in greenish clayslate and argillaceous sandstone. The proportion of gossany quartz and iron ore found in this and neighboring reefs is considerable; the gold is found in both, in a finely divided state. The lodes are strong and extend for long distances, and will doubtless be found to continue to considerable depths when followed. (1883.)

**BLACKSNAKE REEF.**—(See TALUNGA.)

**BLACKWOOD GULLY** is an alluvial diggings situated on section No. 626, hundred of Kuitpo. It is thought to have been discovered by a Government prospecting party, about twelve or fourteen years ago. The gully has been worked for a distance of a quarter of a mile, and the sinking is shallow. At the upper part of the workings there are apparently several runs of gold, and at this point a wide area has been worked across the flat. Nuggets of moderate size have been found, and recently some very rich specimens have been got in Couch's claim. They were found at a depth of from 10ft. to 20ft., in a vein composed of quartz, gossan, and kaolin. In April, 1887, four and a half tons of stone were crushed by the New Era battery, at Woodside, and yielded 4ozs. 11dwts. of gold. The bedrocks are kaolinized clay, and sandy slates, sandstone, and quartzite, traversed by quartz reefs and veins. It is probable that the alluvial gold has been derived from veins similar to those in Couch's claim, traversing the bedrock. This gully has been worked intermittently for several years. It is likely that a good deal of gold has been taken from it, but, in the absence of any records, it is impossible to form any idea of the amount.

**BLUE STAR GOLD MINING Co.**—(See TEETULPA.)

**BRADY CLAIMS.**—Situated fourteen miles from Mingary railway station. Assay has shown no trace of gold or silver from six samples. (Inspector of Mines.)

**BREAKELL & Co.**—(See BAROSSA GOLDFIELD.)

**BRIND MINE.**—(See WOODSIDE.)

**BRITANNIA GOLD MINING Co.**—Twenty-four mineral claims at Mount Victoria.

**BULLOCKY GULLY.**—(See PARA WIERA.)

**BUNYAROO SPRING**, near Leigh's Creek.—This is the locality where a year or two

ago alluvial gold was discovered in a small gully. No one knows any of the circumstances of the find, but a storekeeper at Leigh's Creek alleged that he bought £200 worth of gold, said to have been found there. (1889.)

BURGESS'S REEF, or the Koh-i-noor Mine, is on Kangaroo Island, and consists of a narrow leader of quartz in clayslate and schistose sandstone, &c. There was no gold visible in the quartz, but a faint colour was obtained from some that was crushed. One and a half tons of quartz were sent to Melbourne for treatment by the Virginia Co. and the United Pyrites Co., and yielded as follows:—40lbs. of pyrites gave 1oz. retorted gold, value £3 17s. 3d. The 40lbs. of pyrites tailings yielded 9grs. of gold—total 1oz. 9grs. (Gavin Gardner, 1887.)

BURTON'S MINE, section 6247, is in the district of Mount Torrens, twenty miles east of Adelaide. A shaft has been put down to a depth of 70ft. on a reef of micaceous iron and quartz, with gold. There is also a cellular silico-feldspathic dyke, from which stone crushed yielded 14dwts. of gold per ton. The reef and dyke strike east and west. (1885.)

BUTTAMUK.—(See under SILVER-LEAD.)

CALIFORNIA CLAIM.—On the Queen Bee (New Luxemburg) line of reef; a crushing of 10 tons is said to have averaged 9dwts. per ton.

CHAPMAN'S GULLY.—(See ECHUNGA.)

COMET MINE.—(See ECHUNGA.)

COTTIER'S HILL LEAD.—(See BAROSSA GOLD-FIELD.)

CRITERION MINING COMPANY.—Locality of property, Mount Pleasant. No information of work since 1873.

CRITERION REEF.—(See TALUNGA.)

CROW'S CLAIM, adjoining the Queen Bee Mine.—Two shafts were sunk to a depth of about 100ft. in soft micaceous and hornblendic schist, containing thin veins of quartz showing gold; but no large reef has yet been struck.

CRYSTAL GOLD MINING COMPANY.—(See ECHUNGA.)

CUTAWAY HILLS, near the Leigh's Creek railway station.—Colours of scaly gold were found in prospecting the shallow alluvium. The ground should be further tried by testing the deep alluvium of the neighboring flats.

DAY DAWN.—Locality, Waukaringa, adjoining West Alma; area, seventy-nine acres of Crown lands, on long lease. There is a lode running east and west, 2ft. 6in. wide. One shaft has been put down 176ft. following the dip of the lode. The matrix of the ore is quartz intermixed with ironstone, and the country rock is sandstone. No ore has yet been treated.

DEBAUM'S CLAIMS.—Situated near New Mingary Mine, north of and adjoining Pope's claims. A shaft has been sunk on a reef 4ft. wide, striking W. 20° S. The rocks in the locality are metamorphic and intrusive. The formation generally resembles that of the Barrier.

DURDAN.—(See TALUNGA.)

DUSCOVITCH'S REEF.—(See TALUNGA.)

**EAST ALMA MINE**, in the Waukaringa District, adjoining the Alma and Victoria Mine, and flanked by various unworked gold-mining leases on the east side. The area held is seventy-seven acres under a twenty-one years' Crown lease. There are two lodes, having a strike east and west, and 2ft. 6in. wide. Two shafts have been put down, respectively 190ft. and 109ft., following the dip of the lode, and from the former there is a drive 148ft. long, and from the latter 20ft. The lode formation contains quartz intermixed with ironstone, and the country rock is sandstone. No ore yet treated. The company has spent in the work of development to date £3,151 2s. 8d.

## THE ECHUNGA GOLDFIELD.

It is claimed that this field was discovered in the early part of the year 1852 by Mr. W. Chapman. The first sign of gold was got on what was known as "The Company's land," not far from the old Wheatsheaf Inn, and a thorough search was begun. Very rich surface gold was found on land not far from the place where the first prospect had been washed, on the side of the hill above Donkey Gully. The gold was traced thence to Chapman's Hill, where it was found at the foot of a tree, laid bare by the dripping of water from the branches. Half an ounce was picked up by dry fossicking, and on the following day several ounces of gold were washed from the roots of this tree. An offer of £1,000 reward for the discovery of a payable goldfield was published in the *Government Gazette* of December 18th, 1851. Mr. Chapman, sen., and Mr. Hampton went to town on August 23rd, 1852, to claim the reward, taking with them about 7oz. of rough gold. The conditions of the reward were that licences (at that time 30s. each) to the value of £1,000 should be taken out during the first two months, and that £10,000 worth of gold must also be found within the same period of time. In two months 684 licences were taken out, being equal to £1,026 sterling. The Messrs. Chapman, Hardiman, and Hampton applied for the reward after an interval of three months, but were not successful. There was no proof that £10,000 worth of gold had been obtained, except the statements made by diggers and storekeepers; these represented that £18,000 worth had been got. The matter was brought before the Executive Council, and a sum of £500 was given to the prospectors, leaving the question of reward still open. Nineteen years ago two sums of £200 and £300 were paid for the discovery of gold at Jupiter Creek. Mr. W. Barker, a storekeeper on that field, bought gold to the extent of £3,000.

**BERTRAM'S REEF** was taken up in 1872. The gold was first found in an almost flat bed of quartz, 13ft. wide, and 3ft. thick, splitting up into leaders southwards. Twelve tons of this stone yielded 3½dwts. of gold per ton; and 20 tons, from a depth of 32ft., gave 6dwts. per ton. Shafts and cuttings were put in on a large quartz reef in yellow sandstone, grit, and quartzite, with kaolinized clayslate in bands. The deepest shaft was 80ft.

**BIG BEN MINE** some years ago produced a quantity of very rich stone, and was worked for some time, but after a while the reef was missed and the mine was stopped. It is stated that recently the reef has been recovered, and splendid specimens of stone taken from it. It is said to be 11ft. wide, and that a trial crushing of five tons gave a return of 15dwt. to the ton. [Over twenty diggers altogether are in this locality said to be doing rather better than merely getting food, and about twenty more are engaged in reefing on different claims.]

**BIGGS' FLAT**.—A patch of rich ground was found here in 1877 by a Government prospecting party. The depth of sinking varied from 7ft. or 8ft. near the river to 36ft. at some distance from it. A good quantity of gold was got, of which the coarsest pieces weighed about 2oz. Native copper was found with the gold. Other

places on this flat were prospected, but, as far as is known, no payable results were obtained. The sinking varied from 25ft. to 30ft. in depth, and was very wet. It is probable that other leads of gold are to be found on the flat.

**BREAK-OF-DAY RUSH**, a small patch of surfacing, from which about £40 worth of gold is supposed to have been obtained.

**CHAPEL HILL** and **WINDLASS HILL** contained basin-shaped hollows, filled with boulder and pebble wash, and were rich in gold. From the vicinity of these basins several small leads of gold started. Yorkey's lead was followed down into Wattle Flat, where it became too poor to pay for working. Sandy's lead started at the surface, and yielded from one claim, 8ft. square, 25ozs. of gold, and a nugget of 6ozs. in weight. There are a number of shafts sunk, varying in depth from 10ft. to 120ft. on various leaders, one of which carries a little gold.

On the west side of Chapel Hill, gold was got at the surface; going westward the lead was found to pass over falls or precipices of 20ft., 15ft., and 10ft. in height, with flat spaces between. Where the bottom dipped towards these precipices there was the richest ground. They did not run straight; they were much cut under in places, and ran quite out at Bell's Point. The gold was patchy, with narrow connecting gutters. In some places these were very rich, prospects having been obtained of 12ozs. to the tub, and 5oz. or 6ozs. to the dish.

**CHAPMAN'S GULLY** was the one first opened on the field, and proved to be the richest; at one place some rich specimens of gold in ironstone were found. An ironstone leader crosses the gully, but has never been prospected (Dec. 1884). The depth of sinking at the upper part of the gully was from 6ft. to 7ft., and 12ft. at the lower part. The gully has been worked, and was very rich up to the private property (sec. 3893), and it is probable that that land contains a quantity of gold.

**CHAPMAN'S GULLY MINE** was started in 1861. The main shaft was put down 130ft., but no gold was met with. On a white quartz leader, a west underlie shaft was put down 40ft. It was driven on for a distance of 25ft., and a prospect of 2grs. to a dish was obtained. A second shaft, 44ft. deep, cut a gossany leader, dipping west, carrying gold. A third was put down on a white quartz leader carrying gold, and several other shafts were sunk to shallow depths.

**CHRISTMAS RUSH**—Here the sinking was soft, and varied from 30ft. to 40ft. in depth. The bottom was uneven, and payable gold was obtained.

**COMET MINE**.—An engine shaft was sunk 130ft., and an underlay shaft was put down on a reef of from 2ft. to 5ft. thick. Ten ounces of gold was got from the crushing of a few tons of quartz. Southwards 3ozs. were washed from four dishfuls of dirt. A crushing of ten tons gave 8dwts per ton. Some prospecting was done in this mine during 1885-6, but no payable results were obtained, and the machinery has been removed.

**CRYSTAL GOLD MINING COMPANY**.—Locality, Jupiter Creek; area, twenty acres. No further information obtainable.

**DIAMOND GULLY**.—A small quantity of gold was got in hollow ground; but it was not sufficiently rich to be payable.

**ECHUNGA GOLD MINING COMPANY**.—No. 1 whip-shaft was sunk to the water level, 90ft., and No. 2 shaft 70ft., with a drive, in which was cut a leader carrying gold. No. 3 shaft was sunk 50ft. in search of a leader in which gold has been found some years previously. The leaders dipped to the west until they came to what is known

as the "black leader." From this some good specimens were taken. Its thickness varied from 6in. to 16in. At a depth of 60ft. a large number of leaders were met with, averaging about 1in. thick. A crushing taken from a face of 7ft., in which were four leaders, went 2½dwts. to the ton; and a crushing of about forty tons from the leaders yielded about 50ozs. of gold. A deep shaft was sunk to a depth of 250ft., and at 230ft. a drive was put in north-west for 180ft., but nothing was found. A second drive was put in to the east 220ft., and a bunch of mundie and copper ore was met with.

**ECHUNGA GOVERNMENT PROSPECTING PARTY.**—Early in 1866 the Government decided to test the deep leads on Crown lands in the neighbourhood of Echunga. The first site selected was on sections Nos. 158 and 159, hundred of Kuitpo. Shafts were sunk, and the existence of a deep lead was proved. The washdirt consisted of waterworn quartz and other gravel, and was similar to that found to be auriferous in the old Echunga diggings. It occupied a watercourse of over 300ft. in width, and varied in thickness from 1ft. to 2ft. The bedrock was soft decomposed slate and pipeclay. A drive of 260ft. was put in from the main shaft at a depth of 65ft., and was driven across the lead near its junction with the wash. The dirt was tested with the dish for the whole length of the drive. In appearance it was most favorable for gold, and there were all the indications usually found in similar drifts and well-defined gullies, and yet not a trace of gold was found. This is extraordinary, and probably is the first instance in which an old pliocene lead in a gold-bearing district has proved to be absolutely barren of gold. The second site selected was on section 337 and others, adjoining hundred of Kuitpo, and about two and a half miles south of Echunga. Trial shafts were sunk across a wide extent of flat country and a lead was found. The deep ground had to be tested by boring, as the presence of drift sand rendered sinking difficult. Several bores were bottomed, but only a thin stratum of washdirt was found. The drift sand made the boring exceedingly difficult work. As the bores progressed eastward the ground became deeper until the lowest depth was reached at 110ft. At this point the work was discontinued as the next bore would have come on private property. The manager of the party, Mr. G. Mellor, also reported that to sink a shaft through the drift sand that he had met with would cost £2,000. Although the upper part of the lead has proved barren, yet the lower part towards the Meadows may be auriferous. But as the best sites for shafts are on private property, some time will probably elapse before anything is done to test the leads.

**ECLIPSE MINING COMPANY.**—No records.

**GERMAN GULLY.**—A ridge of rock in one of the claims contained copper.

**GOLDEN REEF MINE.**—Three shafts were sunk to depths of 108ft., 110ft., and 50ft. The last one cut a leader at 25ft. which carried gold. The mine was started in 1882.

**GREAT EASTERN.**—Strike of reef, easterly; dip 40° south. The country consists of blue slates and calcareous slates, and the reef formation is cellular quartz and gossan, with gold visible.

**HAHNDORF GULLY** was discovered in 1856-7. The first payable gold was got by S. Jeffery, in about 7ft. sinking; higher up the gully claims were bottomed at 20ft. The gold was rough and rugged. A branch gully was worked in 1872.

**JACKMAN'S MINE.**—Drives and shafts to depths of from 30ft. to 60ft. have been put down to prospect veins of quartz, ferruginous quartz, and ironstone, traversing quartzite grit and argillaceous sandstone. There are no well-defined walls, the formation being merely a collection of veins; some of them contain pyrites. In one

of the drives a dyke-like mass of kaolin, with quartz and small veins of decomposed feldspar, with quartz and mica, has been cut, and might be prospected for gold with advantage. No quartz from this mine has been crushed, but it is estimated to yield from 5dwts. to 10dwts. of gold per ton.

**JUNCTION MINE.**—The strike of the reef in this claim is east, and the dip 30° south, and it consists of quartz with specks of galena. It is only a small vein; and there is no information of results obtained. (1887.)

**JUPITER CREEK.**—A claim was taken up in 1868 by Breckel & Co., who erected crushing machinery and sank a number of shafts, ranging in depth from 50ft. to 100ft., and connected by a drive 474ft. in length. A reef was cut at a depth of 70ft., and a bucketful of stone yielded 1oz. 3dwts. (1887.)

**KANGAROO MINE** was discovered in 1872, and a company was formed. A small crushing, taken from a westerly leader from 4in. to 6in. thick, gave gold at the rate of 2ozs. to the ton. A shaft 95ft. deep was then sunk, at 50ft. the reef was cut, and a drive south was put in a distance of 100ft.; a crushing gave less than ½oz. per ton. Another shaft was sunk 150ft., with a drive of 250ft., but no reef was cut. The mine was then abandoned. In 1881, however, work was resumed, and a crushing from the 95ft. shaft yielded ½oz. per ton. A main shaft was then sunk 100ft., and a battery and machinery erected. The works were then stopped, owing probably to want of funds. Six tons of quartz were crushed by Mr. A. von Doussa, at Hahndorf, and yielded 8ozs. gold; the stone was from a leader which pinched out on being followed. (1887.)

**KING MINE** was started in 1881. An underlay shaft was sunk on the reef, to a depth of 120ft. At 71ft. the reef was 4ft. thick, and a drive was put in along its course, ten tons of quartz yielded 1½ozs. of gold; 250 yards to the east another shaft was put down to a depth of 50ft.; here the reef was 3ft. thick, and ten tons of quartz gave 1oz. of gold. (1887.)

**LAWRENCE'S CLAIM.**—Three shafts sunk to depths of 20ft., 28ft., and 35ft., at distances of 20ft. to 30ft. apart, were connected by drives, in a soft, decomposed sandy and micaceous slaty shale, through which pass a number of small leaders. Near the surface these veins are composed chiefly of kaolin, becoming mixed lower down with glassy and ferruginous quartz and ironstone. In them, near the surface, some rich patches of gold were found, but owing to their number and irregularity, the run of the gold is difficult to follow. Comparatively little work has been done. There is no crushing apparatus, and the gold was washed out with cradle and dish. It is impossible to ascertain the total amount of gold found, the only certain information being that 41ozs., of the value of £157 16s. 10d., was sold to the Melbourne Mint through Mr. H. Hayman. This was shortly after the work began. The gold found is often in filaments; the largest piece, when cleaned, weighed 2ozs. The mine was discovered in 1884. In 1885 twenty tons of stone were raised and were crushed at the Ridge battery, Woodside. The yield of gold was 1oz. 6dwts. 6grs. (1887.)

**LONG GULLY.**—Three companies were formed in 1866 to work the cement (or conglomerate) in this gully, but no payable results were obtained. (1887.)

**LONG GULLY MINE**—Locality, Jupiter Creek, and worked in 1872. No records left.

**NEW NORTH CRYSTAL CALEDONIAN GOLD MINING SYNDICATE.**—Sixteen quartz claims, twenty-eight acres, situated at Jupiter Creek. (1887.)

**NEW RUSH** was discovered in 1858 or 1859 by a party of eight prospectors, who were rewarded by a grant of money from the Government. The prospectors also

discovered gold at Blacksand Corner and at other places, which have since been worked. Two or three months after the first discovery payable gold was struck, and yielded from 12ozs. to 14ozs. to the load of dirt. The gold was scattered along the foot of a precipice 10ft. to 15ft. high, on a flat bottom. The sinking ranged from 20ft. to 30ft. in depth, and was very hard, owing to the beds of gravel and cement. (1887.)

**ONKAPARINGA RIVER DIGGINGS** were discovered in 1870 by Messrs. Scudds. The river flat was found to be auriferous as far down as Pennyweight Flat. The payable gold was found between the water-holes; some of these were pumped out, but very little gold was found in them. Seaman's Point was the richest part of the river; payable gold was also got at Blacksand Corner, and near Bigg's Flat; at Hack's Bridge also it was discovered, but not worked. (1887.)

**PHENIX GOLD MINING COMPANY.**—Fourteen acres, part of section 356, Jupiter Creek, hundred of Kuitpo, and known as Wolters' claim, leased from the Crown. The sole work done by the proprietary of this claim was to sink a main shaft 11ft. by 4ft. 6in. down to 200ft., and closely timbering it, and driving 200ft. The intention was to go down with the shaft to a depth of 300ft. or 400ft.; but being unable to raise the necessary capital the company, seven months after incorporation, went into liquidation. (1887.)

**PLANE & RIDDLE'S MINE.**—The workings consist of an underlay shaft 110ft. deep, a vertical shaft of 20ft., and a drive of about 20ft. in length, put in an easterly direction from the underlay shaft at a depth of 70ft. The bedrocks consist of mottled kaolinized clayslates and sandy shales, dipping easterly. The reef from which the gold is procured is composed of an irregular dyke-like mass of soft decomposed claystone, intermixed with quartz, and a ferruginous gossany lode formation, with veins of kaolin. The work done was very limited (1884). An excavation of irregular shape had been made where the stuff had been stoped out, judging by which about 20 to 25 tons have been removed and washed. This is said to have yielded 428ozs. of gold, some of which was in small nuggets. The underlay shaft has reached the water level at 110ft., and in it there is another reef lying more or less parallel to the one worked. Adjoining and near to this claim there are several others which have been worked and have yielded small quantities of gold. (1887.)

**POOR MAN'S GULLY and POOR MAN'S HILL.**—The sinking was through hard gravel and cement, varying in depth from 1ft. to 30ft.; payable gold and also diamonds were found here. (1887.)

**QUARTZ BLOW, Chapman's Gully.**—Gold was found in leaders by the alluvial miners in 1855, the surface leaders being very rich. The National Company purchased the claim, erected machinery, and sank a shaft 125ft. for water. Of this they got a good supply. In following the leaders down 30ft., a five-gallon bucketful of specimens is said to have contained £300 worth of gold. This company also prospected a large reef, but without any good results. On the ground again becoming open to miners, small patches of gold were got from time to time, and on the discovery of a patch rather richer than usual, in 1881, by R. and T. Hall, the claim was sold to two gentlemen, who formed it into a company, called the Echungu Gold Mining Company. (See *ante*. 1887.)

**QUEEN MINE** was discovered in the year 1871. Gold was found on the surface, in a leader which yielded 40ozs. of gold. Subsequently five tons were crushed and gave 5dwts. per ton. In 1881 the ground was taken up by a company. They erected a battery, and pumping and winding machinery; and sank a shaft 100ft. deep, with a drive 100ft. west. A reef was cut 4ft. wide carrying a quantity of mundic, and was driven along for a distance of 30ft. To the north of the main shaft, two other shafts

were sunk, and were connected, at a depth of 25ft., by a drive 180ft. long; twenty-three tons of stone were crushed and yielded  $4\frac{1}{2}$ ozs. of gold.

**SAILOR'S GULLY**, discovered in 1872, revealed a lead of gold extending the whole length of the gully. The sinking was in hard and dry alluvium, and to a depth of from 6ft. to 15ft. The largest nugget found weighed 4ozs. (1887.)

**SAWMILL GULLY**, discovered in 1872, yielded nuggets, the heaviest of which were about 1oz. Gold in quartz was also found. The sinking was wet, and the depth ranged from 1ft. to 10ft. (1887.)

**SIMOND'S GULLY**.—Three or four claims were payable. Professor Ulrich, in his report (1872), states that a great portion of the gold found in Felter's Flat and Chapman's Gully was not waterworn, but hackly and crystalline; a circumstance which indicates that, whilst the waterworn gold came from the denuded pliocene drifts, the hackly and crystalline were derived from the quartz reefs in the immediate vicinity. (1887.)

**SOUTH AUSTRALIAN MOUNT MORGAN GOLD MINING COMPANY**.—No information.

**SOUTH CRYSTAL MINE**.—Situate in Jupiter Gully. A large quantity of work has been done, and a great many quartz stringers have been met with in the drives, and leaders have been intercepted. The Inspector of Mines says that what the prospecting undertakings want in this neighborhood is a trial sinking to a depth of 500ft. before driving or cross-cutting. (1887.)

**SOUTH ECHUNGA MINE**, started in 1881; machinery was erected, and a main shaft was sunk to a depth of 180ft., but no reef was found. (1887.)

**STJRLING REEF**.—At a depth of 4ft. some gold-bearing leaders were found in the slate and greenstone. Good results were obtained by simply crushing and washing the stuff, and an Adelaide company erected a five-stamp battery, and work was continued for about twelve months. The profits not being sufficient to cover the expenses the work was stopped. During the next nine months tributors made very good wages in working it, then five more stampers were added to the battery, and crushing was carried on for about eighteen months, and then the mine was abandoned. The material crushed consisted of quartz and ironstone leaders, and a greenish soapy stone known as "green dyke." The richest gold was found in the last-named stone. The place of working was a large open cutting in grit, slate, sandstone, and conglomerate, the latter being composed of kaolin and waterworn quartz, with mica and feldspar crystals. In the hard rocks, magnetic ironsand is plentiful, and quartz and ironstone leaders are visible to a small extent. Professor Ulrich visited and reported on this mine in 1872. He did not consider it a genuine quartz reef, but more nearly resembled what, in Victoria, are called mullock reefs. He compared it to a large fissure, in places 30ft. and 40ft. wide, filled confusedly with masses of the wall rock-grit and slate. The interstices between these masses are filled with mullock enclosing irregular pockets and veins of quartz, through which rather solid crystalline specks of gold are distributed. Irregular veins cross the mass in all directions, horizontally, vertically, and obliquely. Consequently, as each vein cannot be separately followed, the reef has to be quarried out, and the stuff subsequently classed. This, besides being a troublesome process, is also one during which it is impossible to prevent a large quantity of poor matter getting mixed with the quartzose mullock, and thus producing the low yield of 2dwts. to  $2\frac{1}{2}$ dwts. per ton average. There can be no doubt but that this reef largely contributes, by denudation, to the gold found in the Onkaparinga River. Professor Ulrich was of opinion that, on a large scale, the reef might be profitably worked, and that there was a chance of its becoming much better defined in depth. (1887.)



**VICTORIA MINE** was discovered in 1872. The lode consisted of hard quartzite, interlaced with gold-bearing quartz veins. It was very rich near the surface. The deepest shaft was 70ft. to the water level, with a drive of 70ft. to the reef. Shafts, trenches, and open workings were put in along the outcrop of a quartz reef striking north, and underlaying east, through quartzite, sandstone, and kaolinized clayslates. (1887.)

**VICTORIA REEF MINE.**—Situated in Sailor's Gully. Very rich shoots of gold-bearing quartz, says the Inspector of Mines, have been found, which have quickly cut out. The reefs should be proved below water level. (1889.)

**VICTOR GEORGE MINE** was taken up and worked in 1881, on a brown ferruginous leader dipping west, and from 1ft. to 2ft. thick. One hundred feet east of the reef a shaft was sunk 70ft., with a drive 100ft. to the west. Five tons crushed yielded  $\frac{1}{2}$ oz. to the ton. Other shafts and tunnels were put in on hard massive quartz veins in sandstone and quartzite. (1887.)

It is noticeable that a small amount of work only has been done in testing the reefs at a depth. Where deep shafts have been sunk the reefs met with have not been followed or worked in a systematic manner. It is impossible to state the amount of gold obtained on the field since its opening. In a return made in 1871 by Mr. W. J. Peterswald, Warden of Goldfields, the value of gold found during the first three years that the field was worked is estimated at £250,000.

The following return of gold bought by the English, Scottish, and Australian Chartered Bank, from May, 1866, to November, 1872, has been supplied by Mr. A. M. Woods:—

	Total oz. dwts. grs.	Total Value. £ s. d.
Onkaparinga .....	777.13 2	3,003 18 0
Echunga and Jupiter.....	2,021 7 17	7,583 16 1
	<u>£2,799 0 19</u>	<u>£10,587 14 1</u>

**ECLIPSE MINE** is on section No. 80, hundred of Onkaparinga. The reef strikes north and dips to the eastward, and the bedrock, consisting of greenish clayslate and sandstone, strikes north and south, and dips 45° east. Gold was found in the year 1875, and the place being prospected, carbonate of bismuth, showing gold, was found. This, on being assayed, is said to have yielded gold at the rate of 14ozs. to the ton. A small company was formed, and the reef was worked for some weeks. The results obtained, however, were not sufficiently good to justify a further expenditure of money, and the company dissolved. It was subsequently reported that the reef had not been worked at the spot where the best indications of gold had been seen. The section more recently became the property of Mr. Love, and work was resumed on the reef. The results are reported to have been exceedingly good. The country in the neighborhood is favorable for alluvial gold in the gullies and surfacings. (1883.)

**ECLIPSE MINE EAST** is on section No. 65. A shaft was sunk here (1883) in the hope of cutting the Eclipse reef at a depth of 100ft. No records.

**ELECTRA.**—Section 2791, hundred of Kuitpo, upon which some shafts were sunk, but there is no record of results.

EMPRESS VICTORIA.—(See TEETULPA.)

EUDUNDA HOPE.—(See MANNAHILL.)

EUREKA.—(See WOODSIDE.)

FOREST RANGE DIGGINGS are sixteen miles N.E. of Adelaide, on the road to Lobethal, in the hundred of Onkaparinga. As early as 1854 gold was found in Stony Creek, section 514. Prospectors Biggs, Mason, and Norton, got 20ozs. gold from two loads of washdirt. They sank to a depth of 25ft. in a well-defined gully running into Stony Creek. A steep branch gully was also worked, and one near the main road. The country rocks consist of greenish micaceous clayslate and kaolinized slates; there are also large quartz reefs with ferruginous cappings. The Inspector of Mines says of this property:—An enormous quantity of prospecting has been done at shallow depths, and shafts sunk in clusters, apparently without any definite object. One tunnel has been driven 234ft., and its greatest depth is not more than 40ft. from the surface. The ground has been proved only in one place to a depth of 145ft. If the reefs were proved to a depth of 500ft. it is probable that satisfactory returns would be obtained. In one place carbonate of bismuth was found, but the discovery was not pursued. For this present edition Mr. Vinrace Lawrance, at request, has supplied the following information:—The company is mining for gold and bismuth, and holds 238 acres of freehold. No true fissure lode has yet been discovered, but innumerable veins, quartz deposits, and dykes exist. The general strike is N. 4° to 6° W., with a dip 38° to 60° E., the reefs varying from 12ft. width to mere streaks. Eight shafts have been sunk of depths ranging from 40ft. to 106ft., of which only three follow the dip of the reefs. The nine drives aggregate 1,382ft. The reefs consist of concretionary ironstone, quartzite, and quartzose sandstone. The country rock is said to be lithologically identical with that of the central and western goldfields of Victoria. The ore consists of iron and arsenical pyrites, and so far no payable reef has been opened. A crushing of 25 tons gave only 2dwts. to 3dwts. of gold to the ton. It is, however, estimated that from £15,000 to £20,000 worth of alluvial gold has been obtained here by prospectors and diggers in former times.

FOUNTAIN HEAD.—(See WOODSIDE.)

GAWLER RIVER.—The upper branches of the river, known respectively as the North and South Para, are auriferous, gold having been found along their courses. Very little prospecting has been done, owing to the greater part of the ground being private property. (1887.)

GOLDEN GATE MINE.—Near to Reedy Creek Mine; no particulars obtainable.

GOLDEN GULLY.—Locality, eleven miles north of Petersburg, hundred of Morgan. Several shafts have been sunk on quartz, jasper, and ironstone, specular iron and gossany veins, apparently in the hope of striking some kind of metallic ores, and without any surface indication at all warranting such work being done. There were no satisfactory results. (1887.)

GOLDEN POINT CLAIM.—Locality, fifteen miles east from Terowie. Veins, composed of quartz and gossan, with pyrites and iron oxide, occur between layers of clay slate and jointed sandstone, proved in a shaft to a depth of 50ft. It was stated that from Ample's claim 2½ tons of stone yielded 5½oz. of gold in treatment at Woodside. The rocks are similar to and are a continuation of the Ulooloo rock, and the country generally has an auriferous appearance. Mr. Adamson, jun., has forwarded the following as the result of crushings:—At Teetulpa battery 2 tons gave 1oz. per ton; Eureka battery, 2 tons gave 14dwts. per ton; and at Ballarat School of Mines,

10 tons gave 10dwts. per ton. The Inspector of Mines reported last year on this property. He saw veins of auriferous quartz and gossan from three to eight inches thick. The gold found was fine, and assays ranged from 5dwt. up to 1oz. 1dwt. per ton.

**GREAT EASTERN CLAIM.**—(See MANNAHILL.)

**GREAT IRONCLAD GOLD MINING COMPANY.**—(See TEETULPA.)

**GREEN AND GOLD MINE.**—(See also "COPPER.") This property is ten miles from the Olary station. Near the surface coarse gold is said to have been frequently found in the copper, and fine gold can be obtained by crushing the gossan found in one of the lodes. There are quartz outcrops on the neighboring hills, which should be prospected for gold. (1889.)

**GRUNTHAL MINE** is situated about a mile north of the township of Grunthal. There are two shafts, both nearly full of water. On the surface there are several buildings, including an engine-house. The veinstone raised consists of quartz, calc-spar, and gossan, with iron and copper pyrites. The country rocks are clayslates and argillaceous sandstones, dipping east. The locality is a likely one for gold. No information concerning the past working of this mine has been forthcoming. (1887.)

## GUMERACHA AND MOUNT CRAWFORD GOLDFIELDS.

Lie about thirty miles N.E. of Adelaide, in the hundred of Para Wirra, and the following are some of the details respecting the claims:—

**ADELAIDE SYNDICATE, Watt's Gully, Gumeracha.**—The first shaft was put down on the eastern side of the gully. When the solid ground was reached a drive was put in under the gully with the idea of cutting a reef. The second shaft was put down on the top of the hill to the depth of 80ft. Two very small leaders were cut, but no reef. (1887.)

**AVENUE GULLY, Gumeracha Goldfields.**—On the western side of this gully are three or four old shafts. One is about 50ft. deep, and has been timbered, but the timbers have become rotten and unsafe. There are two reefs, one solid white quartz and the other ferruginous quartz and gossan; they strike north and south, and dip 70° or 80° west. The rock is mica schist. (1887.)

**GUMERACHA GOLD VENTURE** is situated in Dead Horse Gully, on the Gumeracha goldfields. This reef was found by Wallace in 1885; it strikes N. 20° W., dips west, nearly vertical. In places it is nearly 6ft. wide from wall to wall, but is not solid. There are two shafts. The northern one was sunk 43ft. on the reef, but as it was unsafe, another was put down to the southward to a depth of 37ft. The reef was not struck, the shaft being a little to the east of it; but at a depth of 15ft. a leader was struck. The intention was to sink 60ft. and drive to the reef, but work has been suspended. The rock is mica schist, striking north and south, and dipping east 50°. It is very tough to work in, and the difficulties are increased by large influx of water in both shafts. (1887.)

**GUMERACHA SYNDICATE.**—This claim is situated across Watts' Gully, close by the fork, and covers all the ground where the heaviest gold (alluvial) was found. A tunnel has been put in 86ft. into the eastern bank of Watt's Gully and the reef cut. There is also a shaft sunk through mica schist to a depth of 60ft. in the eastern branch gully; two small leaders containing mundic were passed through, but no reef of any size was struck. (1887.)

**HANNAFORD'S REEF**, Gumeracha, is a large reef running in north-easterly direction, dipping to the west. A series of shafts have been put down close together along the whole length of the outcrop, besides numerous pits and trenches. The mine was worked many years ago, but no records are obtainable.

**HAY VALLEY GOLD MINING SYNDICATE**.—Mineral lease section 5301, a mile and a half north-east of Nairne. No records.

**HUTCHINSON'S CLAIM**, Gumeracha, between Watts' and Snake Gullies. There is a small reef striking S.W. and N.E., dipping west, containing mundic, and from which some fair prospects were obtained at the surface. A shaft was sunk, and at 15ft. went through the reef; it was carried down to 40ft. in the hope that the reef would turn and dip in an easterly direction. The claim is now abandoned. (1887.)

**KAPUNDA SYNDICATE**. Watts' Gully, Gumeracha.—This consisted of some claims taken upon the western side of Watts' Gully, near the fork, for the purpose of finding the vein from which the gold was supposed to have come. Fossicking amongst the quartz "blows" was first tried, but no gold was found. A tunnel was then put into the hill for a distance of 137ft., at a spot about half-way down from the ridge. The rock passed through was mica schist and segregations of quartz dipping to the east, but no reef was found. Operations were suspended. The Kapunda Syndicate had other claims at the head of Blood and Thunder Gully. A shaft has been sunk and various cuttings made, but no reef found. (1887.)

**PHILP'S UNITED MINE**, which is at the head of Watts' Gully, Gumeracha, was opened 1st January, 1886. There are two shafts, with several costeens and pits. The first shaft, and the furthest up the hill, was sunk on a reef dipping to the west; the reef was cut at 14ft. from the surface and was found to be from 12in. to 18in. wide. The shaft was subsequently sunk to 52ft., and a 26ft. drive put in at the bottom, but without result. No. 2 shaft was sunk lower down the hill and cut a reef 2ft. from the surface; at 13ft. a second reef was struck of a width of from 3ft to 4ft. and striking S.W. and N.E. 50°. At 37ft. a floor was cut, striking north and west, dipping W. 50°. (1887.)

**WATTS' GULLY**, on section 111, hundred of Para Wirra, is the centre of operations, and was discovered in 1884, but was not generally known until about 1885. This gully was remarkable for the number of nuggets found, some of which were of considerable weight. One purchased by the Government weighed 14oz. 8dwts. The total amount of gold obtained is not known, but may be estimated at not less than 1,000 ounces. In addition to Watts', several other gullies have been opened up to northward for a distance of two or three miles. (1887.)

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**INGLEWOOD MINING COMPANY**.—Gold has been found at Inglewood, fifteen and a half miles from Adelaide, in a north-easterly direction. The only information obtainable concerning the results is, that during June, 1870, the E.S. and A.C. Bank bought 7ozs. 15dwts. of gold obtained there.

**JACKMAN'S MINE**.—(See ECHUNGA.)

**JOHN BROWN LINE OF REEF**.—This now forms part of the New Mingary, and includes three other claims that have been amalgamated. Shafts have been sunk along the line of reef, and gold can be seen in the surface quartz and gossan. A crushing of 5 tons from the vicinity of the John Brown shaft averaged 18dwts. gold per ton. The country rocks are metamorphic micaceous granite, with coarse eruptive granite dykes. (1889.)

JUPITER CREEK.—(See ECHUNGA.)

KANGAROO MINE.—(See ECHUNGA.)

KING'S MINE.—(See ECHUNGA.)

KING'S BLUFF, three miles west-north-west of Olary railway station, on the Petersburg-Cockburn railway. A discovery of gold was reported to have been made at this place on the 4th March, 1887, a prospector getting 8grs. of gold to the dish of dirt by washing, at the foot of King's Bluff, in a dry creek running into a gully a quarter of a mile wide and about two miles in length. A rush of from 300 to 500 men took place, but, though the prospectors are said to have obtained an ounce of gold for their first week's work, the results, as a whole, were not encouraging. In common with the Teetulpa field, the want of water is much felt, and owing to this the place cannot be properly tested. In this mine a considerable amount of work has been done in sinking and driving. The lode strikes north-easterly, and consists of irregular masses of quartz, with leaders, cutting through a thick bed of quartzite. The veinstone is white quartz, sometimes flinty, with cavities partly filled with clay and quartz crystals. A micaceous clay, probably a decomposed dyke, is associated with the reef, and also contains gold. The reef apparently occupies fissures caused by the upheaval of the strata in the form of an anticlinal arch. One shaft has been sunk into the slate which underlies the quartzite, and is now in blue calcareous slate with iron pyrites. Southwards, on the same line, a shaft has been sunk in quartzite on a formation of quartz veins between polished walls; these veins also contain gold. Other small veins have been found auriferous here and near the alluvial gully discovered by Messrs. Mellor Brothers. By continuing the present shaft it would be found whether there are other auriferous veins at the junction of the hard and soft strata. In the neighborhood there are also small ironstone and quartz veins, striking east and west through slate. Southward of this mine there are ironstone and quartz veins traversing slate country. One of these has been worked to a depth of about 15ft., and the quartz obtained is said to have yielded 3½ oz. of gold per ton. It is probable that when the rich formations have been sunk through other reefs will be found beneath near the junction of the different beds. Some little while ago the King's Bluff Mine ceased working, and the company went into liquidation. (1889.)

KOH-I-NOOR GOLD MINING COMPANY.—Ten mineral claims on Gorgan's Range, Kangaroo Island. No particulars obtainable.

KUITPO GOLD MINING SYNDICATE.—Formed to work ten quartz claims at Hahndorf. No records.

LADY ALICE MINE.—(See PARA WIRRA.)

LADY EDITH MINE.—(See PARA WIRRA.)

LAWRENCE'S CLAIM.—(See ECHUNGA.)

LONDONDERRY GOLD MINING COMPANY.—(See TEETULPA.)

LYNDOCH.—On section 3250, near Lyndoch, the Government Geologist noted in 1889 that two men sinking through the tertiary drifts were obtaining a little gold in the cemented quartz gravel and boulders overlying the bed rock. The sinking was about 30ft. and dry, but the results were not payable, though it appeared probable that payable gold would be obtained when a deeper run of ground was met with.

McVITTIE'S HILL.—(See TALUNGA.)

MALCOLM'S BAROSSA GOLD MINE.—(See BAROSSA GOLDFIELD.)

## THE MANNAHILL REEFS

Are about eight miles W.  $10^{\circ}$  N. of Mannahill, and eighty miles east of Petersburg, and include the following :—

**AUROBA AUSTRALIS LINE.**—This belt of reefs lie northward of, and roughly parallel to, the Birthday reefs, at a distance of twenty chains to thirty chains. Claims were taken up from opposite McEvoy's Prospecting Claim, in a south-westerly direction, for a mile or so.

**BIRTHDAY LINE.**—On the prospecting claim (McEvoy's) several shafts and excavations have been made. The first is 14ft. deep, and has been sunk on a large quartz and ironstone reef, about 4ft. thick, striking E.N.E. in clay and calcareous cleaved slates. The stuff for crushing consists of ferruginous quartz, quartz, iron ore, and gossan, with a little iron pyrites. A cutting has been made in the middle of the claim across the veins. The largest of these is 2ft. thick, and they underlay S.S.E. In a cutting towards the east, small specks of gold were to be seen in the stone raised;  $6\frac{1}{2}$  tons of stone from this place, mixed with  $1\frac{1}{2}$  tons from Gibson's claim further eastward, was crushed at Waukaringa, and is said to have yielded 15ozs. of gold.

**CHRISTMAS DAY CLAIM** (Roberts & Co.) has an underlay shaft 65ft. deep, at an angle of  $55^{\circ}$  to  $66^{\circ}$ . The reef ranges in width from 6in. to 12in. In addition to brown iron ore and ferruginous and white quartz, the reef contains mundic; small specks of gold are sometimes visible in the stone. (1829.)

**DALTON'S CLAIM.**—Here a large outcrop of quartz occurs, and a trench has been cut. (1888.)

**EASTWARD Ho !**—A prospecting venture on reefs of quartz, iron oxide, and gossan. Operations stopped. (1888.)

**ELLIOT & CLARKE'S CLAIM.**—A shaft has been sunk 12ft. on a reef, which is from 12in. to 18in. wide, striking north-east by east. There is also a shaft 20ft. deep on a vertical reef, which is from 12in. to 18in. thick. Pyrites is here associated with the oxide of iron. About 4 tons of quartz have been raised. (1888.)

**ELSIE MAY REEF.**—Goslin's claim is situated about two miles in a westerly direction from the prospecting claim. This reef has been prospected in several places, and trial crushings taken from two places. At the eastern end the deposit of iron oxide and gossany iron ore, of which the veinstone is composed, lies almost flat on the top a low spur, cropping out to the surface northward and dipping gradually southward, where it has a steeper inclination. The thickness of the deposit varies from twelve to eighteen inches. Six tons have been crushed from this part of the reef. In a west-north-west direction some 700ft. distant a crushing of six tons has also been taken out from an outlying patch of iron ore and gossan, a foot or more in thickness, which is apparently a portion of a flat-reef outcrop, which has not been denuded from the crown of the hill. These twelve tons of ore have been crushed at Waukaringa, with a satisfactory yield of gold. (1888.)

**EUDUNDA HOPE.**—There was a vertical shaft put down 110ft., which passed through pyrites and galena in a small vein. There was also some costeening done, but operations ceased for lack of capital. (1888.)

**GIBBONS & COMPANY.**—On this claim an underlay shaft has been sunk 34ft., on a vein of ironstone and quartz, having a width at the bottom of 1ft. The second underlay shaft further south has a depth of 27ft., and exposes a reef which is from

1ft. to 2ft. thick at the surface, and underlies at an angle of 70° south-south-easterly. From this claim 1½ tons of quartz were crushed with 6½ tons from McEvoy's Prospecting Claim, as previously mentioned; this mixing of the quartz was doubtless accidental, but has rendered the results from both claims uncertain. The specimens shown to the Government Geologist by the proprietors contained the coarsest particles of gold he saw on the field. About 11 tons of crushing stuff have been raised here. (1888.)

GORDON AND STIRLING'S CLAIM is the next, going eastward, adjoining McEvoy's; the first excavation is about 12ft. deep, on a reef of quartz and ironstone, with gossany cavities. The second, 15ft. deep on a large reef 6ft. or 7ft. thick underlying S.S.E. 45°. The third working is a shaft 30ft. deep on a reef from 2ft. or 3ft. thick in the bottom, where it shows a considerable amount of gossan; about 18 tons of crushing stuff have been raised on this claim from the two parallel reefs prospected. (1889.)

GOSHEN CLAIM.—Four or five shafts of an average depth of 8ft. or 10ft. have been sunk on veins of quartz, ironstone, and gossan. (1889.)

GREAT EASTERN.—The Mine Inspector reports :—This claim adjoins the Birthday Claim. A shaft has been sunk 36ft. on the underlay, the lode running west 10° south, and dipping south at an angle of 30°. The stone is a ferruginous quartz, and gold can be seen clearly, coarse and free. The average size of the reef is 10in. Samples casually taken gave 10oz. 8dw. gold, and 8dw. 4gr. silver to the ton. (1889.)

HAYCOCK'S CLAIM adjoins Gordon and Stirling's. An underlay shaft has been sunk 28ft. between two quartz and gossany quartz veins, 3ft. apart. Two other leaders show at the bottom of the shaft, underlying S.E. 45° to 50°. A trial crushing of 5cwt. was obtained from two holes near the shaft, and yielded 14dwts. of gold. (1888.)

HOMES AND RADFORD have sunk a shaft about 30ft. on a quartz and iron-ore reef. There are several mineral veins more or less parallel in this and the adjoining claims. (1889.)

IVEY'S CLAIM.—Two or three small veins have been exposed by trenches and shallow shafts; they have the same underlay and belong to the same belt of reefs as those further westward. An underlay shaft has been sunk 18ft. (1889.)

JENKINS' CLAIM is the most easterly in work. Here some 3 tons of quartz have been raised from a large blow of quartz, iron ore, and gossan in one place, and a similar quantity from two other places where there is a reef 2ft. or 3ft. thick. Here, as well as in some of the other claims near, calcspar (crystallised carbonate of lime) is associated with the vein quartz. (1889.)

H. KONIG'S CLAIM.—An underlay shaft about 25ft. sunk on a small vein. No detailed particulars available. (1889.)

LESTER'S CLAIM.—Here there is an ironstone veins striking E.N.E., and dipping south-south-easterly, which has been sunk on in two places, and about 2 tons of stuff have been raised for crushing. (1888.)

MOORE'S CLAIM.—Three or four shallow shafts have been sunk on two small parallel veins, which underlay to the S.E.E., but are less inclined in that direction than the veins in the other claims; specks of gold have been seen in the stone from the southern vein. (1888.)

**TROJAN MINE** contains two lodes bearing east-north-west, underlaying to the south, and varying in width from 2ft. 6in. to 4ft. The ore is gossan and ironstone. Four and a half tons crushed yielded at the rate of one ounce of gold to the ton. The ore occurs in veins and shoots, which vary in width from 2ft. to 3ft., and dip to the south-west. Four shafts have been sunk, the deepest of which is 60ft., and drives have been put in for a total length of 130ft. A vertical shaft to strike the reef, and with the hope of finding water, is now being sunk. (E. F. Troy, secretary, 1887.) The stone found on this field is composed of hematite, quartz, brown iron ore, iron pyrites, ironstone, and gossan, and it is difficult to see the gold without crushing and washing. Eleven samples, consisting of gossan, quartz, pyrites, and tailings, were assayed, and, with the exception of two, were found to contain gold.

**NO GAMMON REEF.**—Situated about five miles north-west of Mannahill. Work suspended for the present. Several holes have been sunk, and trenches cut to a shallow depth, for a distance of about twenty chains. Commencing at the eastward the first hole is 3½ft. deep, and is in brown iron ore and quartz, which apparently form the broken up outcrop of a reef; the second hole is 6½ft. deep, in rubbly quartz, gossan, and iron ore, also the broken up outcrop of a large reef; the third is a shaft 20ft. deep, in rubbly quartz and soft calcareous clayslates; the fourth is an excavation 2ft. to 3ft. wide and 8ft. deep, in broken ground, apparently the top of a large reef (about 15 tons of stuff have been raised here); the fifth is 15ft. deep, in it a flat ironstone and quartz reef 2ft. to 3ft. thick has been sunk through and followed for a few feet on its underlay; the sixth is an excavation 15ft. deep in kaolinised and calcareous clayslates. Besides these there are other holes and excavations, including a trench some seventy yards long and 2ft. to 4ft. deep. An assay gave 19oz. to the ton of stone from this mine. (1888.)

**PADMORE & Co.**—A shaft has been sunk about 30ft., and 4 or 5 tons of quartz raised. This reef also contains mundic. (1888.)

**POTTER'S CLAIMS** are about 300 yards southwards of Goslin's reef; a number of claims have been taken up on a quartz and iron ore reef, with a low inclination to the southward. No work is being done on this line at present. (1888.)

**ROBERTS & PADMORE, GOLDEN HILL.**—Two veins of quartz and ironstone have been prospected, and about 2 tons raised. A shaft has been sunk 13ft. on a large reef of quartz, gossan, and ironstone. The strike of the reef is north-easterly, and it underlies north-westerly 70°. (1888.)

**ROSEBERRY GOLD MINING Co.**—Sixteen quartz claims near Mannahill. No particulars to hand. (1888.)

**SMITH'S CLAIM.**—An underlying shaft has been sunk 15ft., two veins underlying south-south-easterly 60°. About 5 tons of crushing stuff have been raised. (1888.)

**NECTAR CLAIM** is half a mile north-westerly of the No Gammon Mine, on a north-easterly line. There are no fewer than six shafts within a distance of fifty yards. Ironstone leaders or veins traverse the joints of the bedrock. In the sixth shaft, 20ft. deep, 6ft. of quartz was passed through. The rocks are hard and broken. The ironstone leaders cut across the bedding of the rocks, whilst the quartz reef just mentioned conforms more or less to the bedding. From this claim 2 tons 8cwt. of ore was smelted at the Intercolonial Smelting Works, Spotswood, Victoria, and yielded gold at the rate of 2ozs. 17dwts. 3grs. to the ton, and 2 tons 6cwt. crushed at Waukaringa averaged 2ozs. 11dwts. per ton. (1887.)

**WERNER'S CLAIM.**—A shallow underlay shaft has been sunk on a small vein, dipping 60° south-south-easterly; about 3 tons of quartz have been raised. (1888.)



All these claims adjoin one another along the line or belt of reefs, extending in an east-north-easterly direction for about one mile. They in some places conform to the bedding of the rock for a short distance, at others they cut across it, and apparently fill up fissures made by faults in the strata. The strike of the rocks is roughly approximate to that of the veins, and they dip in a south-south-easterly direction, at a low angle. The rocks consist of clay and sandy slates, claystones, and calcareous claystones. The general strike of this belt of rocks is east-north-easterly, and the general underlay south-south-easterly. The veinstone is composed of a hard glassy and white quartz, with cavities containing goossan, ferruginous clay, iron oxides, and pyrites, and admixtures of these with quartz. The gold occurs in fine particles, and is generally contained in the iron ore and silicious ferruginous rock, though sometimes seen in the quartz. Owing to the nature of the veinstone, it is difficult to discern the gold without crushing and washing the material. Many of the reefs contain traces of copper. The gold has doubtless been derived from the decomposition of the pyrites.

Taken generally the prospects of these reefs are very encouraging, although there is no reason for supposing that all the claims taken up will be payable; the gold being as usual in shoots and patches, which will have to be followed. From the abundance of iron oxide in the veinstones, it is safe to infer that when the water level is reached they will chiefly consist of iron pyrites, which is already present to some extent in some of the reefs near the surface.

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**McMURTRIE'S CLAIMS.**—Situated on Blackfellow's Creek, Hundred of Kuitpo, five miles south of Prospect Hill. The Inspector of Mines reports that there is a strong well-defined reef, on the average 3ft. 6in. wide, principally ferruginous quartz, carrying a layer of plumbic schist, and in this flaky gold can be seen. An average-looking stone taken from the footwall of reef assayed 1oz. 15dwt. gold per ton, whilst the schist, in which no gold was visible, yielded 8dwt. 5gr. Course of reef, N. 10° E. From a shaft 40ft., fully 100 tons stone have been taken out. At the south end a shaft has been sunk 20ft.; reef 3ft. thick, carrying free gold. (1889.)

**MEADOWS REEFING COMPANY.**—About 1872 an attempt was made in the locality named, but sinking was stopped by the heavy influx of water, and operations were not resumed. (1887.)

**MID-ALMA MINE.**—Sixteen acres are held on lease from the Government between the Alma and Victoria and the East Alma, and the two lodes in it strike east and west, one averaging a foot and the other a foot and a half in width. Two shafts have been put down to the respective depths of 296ft. and 93ft., both following the dip of the lodes; and there is a drive of 80ft. The ore matrix is quartz intermingled with ironstone, the country rock being argillaceous sandstone. The total amount expended to April, 1890, in the development of this mine was £3,917 12s.

**MINGARY GOLD MINE (NEW MINGARY).**—The Inspector of Mines has on several occasions examined and reported upon this mine, which is situated in an auriferous country at New Luxemburg, about fourteen miles from Olary railway station. He says that there are several quartz reefs upon the property, ranging from 1ft. to 4ft. thick, already proved to be auriferous to a great depth. The various shafts exhibit large quantities of stone, in which free gold can be discovered—payable, if water can be obtained for treatment. The gold is distributed over a large area. Samples treated by the Government Assayer gave—(1) cellular quartz, 3oz. 5dwt. gold per ton; (2) ferruginous quartz, 1dwt. 11grs.; (3) ironstone copper-stained, 11oz. 9dwt. gold per ton; and in neither of these stones was there any gold visible. This is a valuable property, and each visit confirmed the opinion first formed, that success will follow the economical treatment of the large bodies of stone the mine possesses. The company

has recently been reconstructed as the New Mingary. The REPUBLIC, BISMARCK, JOHN BROWN, DEBAUN'S, FOOTE'S, and the STAR OF HOPE and other claims are included in the New Mingary. (1890.)

MINT MINE.—(See WOODSIDE.)

MONS AUREUS GOLD AND SILVER MINING SYNDICATE.—Property, 200 acres mineral land, near Petersburg. No records.

MONTACUTE MINE.—This mine is mentioned under the head of "COPPER," but it is said to have yielded gold. No information has been obtained beyond the fact that samples from the lode have, on washing, given good colors. (1890.)

MORIALTA.—Gold is being found in gullies on the Morialta estate, at the head of the Fifth Creek, in the hundred of Adelaide. It is of peculiar character, being frequently found in flat pieces, bearing serrated feather-like markings. The owner of the land bought 50ozs. of gold from the diggers, but there is every reason to believe that this represents but a small proportion of the quantity found. Diggers still work there. (1890.)

MORNING STAR GOLD MINING COMPANY.—(See TEETULPA.)

MORNING STAR SOUTH GOLD MINING COMPANY.—(See TEETULPA.)

MOUNT BRANDT GOLD MINING COMPANY.—Twelve quartz claims, 2784 to 2795, one and a half miles from New Mingary Mine. No records.

MOUNT CHARLES.—(See WOODSIDE.)

MOUNT COGAN MINE (KNOWN AS THE WOMAN IN WHITE).—This is situated seven miles west of Waukaringa, and the prospecting has been upon a large outcrop of iron, which shows traces of gold. The Inspector of Mines says that the general appearance of the lode matrix is similar to the richer portions of the reef exposed in the Alma and Victoria Mine, and development should discover shoots of payable gold-bearing stone. A fair prospect, worthy of a full test. A new feature in this mine is the occurrence of native copper in the country rock. The proprietors consider that 6dwts. of gold per ton will pay, with sufficient water. At present the stone has to be raised only 50 to 60ft. (1889.)

MOUNT CRAWFORD.—(See GUMERACHA.)

MOUNT DUTTON RANGE.—In June, 1889, the Government Geologist roughly prospected this locality, which lies some twelve or fifteen miles north-westward of Algebuckina, and higher up the Neales River. Encouraging prospects of alluvial gold were found in several places, though not sufficient to indicate an immediately payable goldfield; but there is every reason to suppose that payable patches of auriferous ground exist and may be found by a diligent prospector. The areas occupied by the Mount Dutton, Peake, and Mount Dennison Ranges, extending from near Anna Creek to Mount Dutton, a distance of about eighty miles, are surrounded by mesozoic plains, with a great thickness of sandstones, shales, and other deposits covering the bedrock. Prospecting for gold should commence on or near the outcrops, and once a lead or run of gold is struck, it is possible that it may be traced far out beneath the mesozoic deposits of the plains.

MOUNT FITTON, seventy-six miles east of Farina. A quartz reef lies about two miles south-east of the trig. It contains hematite and gossan, and yields specks of gold on being crushed. The basin-shaped area around Mount Fitton appears to be a locality favourable for gold prospecting, both in the reefs and alluvium. (1884.)

MOUNT KINTORE CLAIM.—Locality, a mile and a half from Alma to the north-west; area, forty acres. Two peaks on a hill form a centre towards which six distinct reefs of white barren-looking quartz strike. The Inspector of Mines says the whole

hill is a mass of "hungry-looking" quartz, not likely to carry payable gold. He had samples tried by the Government Assayer without any valuable result. Scarcely any testing-work had been done on the claim at the time of his visit. (1889.)

**MOUNT MAGNIFICENT.**—Gold has been found on section 209, hundred of Myponga, near the River Finnis, and two miles in a W.N.W. direction from Mount Magnificent. At a spot twenty chains east of the river, and 150ft. up the slope of the hill, a large quartz reef crops out. A tunnel has been driven into the hill about 10ft. below the reef to a lode formation from 2ft. to 3ft. in thickness, and from which quartz has been excavated for about 16ft. The reef strikes north and south, with an underlay of 45° east. North and south of the tunnel it bends round in the shape of a horseshoe. The quartz generally is very ferruginous. Good prospects of rough gold were obtained from stone taken from the tunnel and the outcrop, and crushed in a mortar. No fine particles were found. The reef is large and well defined. This is the prospectors' claim. On Mincham's claim a tunnel of about 75ft. has been driven along a small reef higher up the hill to the S.E., having a south-easterly underlay, and composed of white and ferruginous quartz. No gold was to be seen in the quartz. An attempt was made by a small company to work these reefs, but they were abandoned before much work had been done, or before any payable results had been obtained. Subsequently shafts have been put down, and tunnels driven, but no valuable discovery has been made. The Inspector of Mines, after a recent examination, states that the mine is situated in an auriferous belt of country. The long tunnel has been driven 275ft. Prospecting for reefs should be encouraged in this vicinity. (1889.)

**MOUNT MOORE GOLD MINING SYNDICATE.**—Sixteen quartz claims amalgamated, situated near the New Mingary Mine, seventeen miles from Mingary Railway Station. (1887.)

**MOUNT OGILVIE GOLDFIELD.**—Locality, near Tower Gap, Mount Lyndhurst sheep-run. Gold was discovered here about the month of August, 1888. It occurred in small veins of ferro-calcite (carbonate of lime and iron) and quartz, traversing silicious and calcareous slates. Rich specimens of gold were obtained from these veins, associated with ores of cobalt, nickel, and arsenic, in which the gold was sometimes found embedded. The Inspector of Mines says there is a continuous run of broken hills and low-lying ranges from Gill's Bluff to Nichol's Nob, a distance of ten miles, capped by beds of concretionary slates, in places ferruginous, and besides there are masses of silicious and cherty slates. The intrusive rocks bear a strong resemblance to those in the goldfields of New Zealand, and the prevailing slate is entirely different to that found further south in the Flinders Ranges. Very little work had been done. Gold is visible in the baryta, and the compact ullmanite nearest the baryta is remarkably rich in gold. A stone that showed no visible gold on being crushed and panned off yielded gold estimated at fully 100oz. to the ton. The vein would pay well for working, even if only for nickel. There is no trace of copper two feet below the surface, though the outcrop contains carbonate of copper. (1889.)

**MOUNT OGILVIE WEST.**—Locality, south-west of and adjoining Mount Ogilvie Mine. Two shafts have been sunk, No. 1 42ft. vertical, passing through nine leaders containing quartz, calcspar and iron, carrying a little gold (1oz. 14dwt. by assay); and No. 2, sunk on the underlie of a lode at an angle of 50° to a depth of 64ft. The width of the lode on surface increases to not less than 20ft. at the depth mentioned, where the lode consists of iron, calcspar, quartz, oxide of manganese, and earthy iron gossan. A picked parcel of 11cwt. of this treated in the Huntington Mill yielded 1oz. 9dwt., being at the rate of 3oz. to the ton, and assays have been had as high as 22oz. gold and 118oz. silver. A small lot of 1cwt. treated by Harrold Bros. yielded 4½ per cent. nickel and ½ per cent. bismuth with traces of cobalt. Two other reefs on the property have not yet been tested. (Captain J. M. Dillon, 1890.)

**MOUNT OGILVIE NEW FIND.**—This is situated about three-quarters of a mile east of Nichol's Nob, and takes in the ground formerly held under lease by the Nichol's Nob Copper Company. The Inspector of Mines reports that the gold was discovered by washing some of the fine stuff that had accumulated from copper ore dressing in former days. Excellent prospects were obtained. There is a well-defined and regular lode 3ft. thick, carrying a low quality copper ore, from which the gold is obtained. (1889.)

**MOUNT PANGÆUS MINE.**—Twenty-five acres of leased Crown lands, situated in Hahndorf Gully, about two miles from Hahndorf. The Inspector of Mines states that a tunnel has been driven 666ft. into the mount, and a shaft was being excavated to ventilate the mine. Two reefs have been intersected, which, if they continue, should unite at about 80ft. below the tunnel level. Work, it is understood, has for the present ceased. (1889.)

**MOUNT PLEASANT DIGGINGS.**—(See PARA WIRRA.)

**MOUNT PLEASANT REEFING COMPANY.**—There was work done in 1871-2-3, but no records are available.

**MOUNT VENTURE** is on section No. 4107, hundred of Onkaparinga. In January, 1887, gold was found on the cap of reef, which strikes nearly due north and south, with an underlay to the east, and traceable on the surface for some distance. A shaft has been sunk to a depth of 63ft., and at 31ft. a crosscut has been put in. This showed the reef to be 18ft. wide. Assays taken from here yielded gold at the rate of 2½ozs. to the ton. At 63ft. drives have been extended north and south along the reef, which consists of ironstone, with veins of quartz. So far, however, the existence of a defined and continuous shoot of gold has not been proved. (1889.)

**MOUNT VICTORIA MINE** is about two miles south-west of Mount Victoria, in the north-east district. Prospecting for copper ore was carried to a depth of about 60ft. The lode contains specular iron, carbonates, red oxide, and sulphides of copper, and iron pyrites. The lode strikes north-west, and is about 2ft. wide. The country rock consists of porphyritic granite, and the lode lies in a soft decomposed granitic dyke. Gold occurs in the green carbonate, the quartz and the iron oxide in coarse and fine specks. The lode is worth testing for gold to a depth much greater than that at present reached. (1883.)

**MOUNT TORRENS GOLD MINE.**—This property, two and a half miles from Blumberg, Hundred of Talunga, was worked years ago as an alluvial claim under the name of the "Criterion," and good patches were found containing heavy gold. The Inspector of Mines reports that the present company hold ground under a lease for twenty-five years. A vertical shaft should cut the reef at the depth of 145ft.; it has an east and west strike, with a dip north 1ft. in 4. The reef, averaging 4ft. in width, is composed of quartz, iron pyrites, and a flucan carrying free gold. One hundred and forty tons, put through an ordinary battery, yielded 7dwts. gold to the ton, whilst two parcels sent to the smelters averaged 1oz. 2dwt. per ton. Two hundred and twenty tons gave 6dwt. of free gold to the ton, but the tailings assay 1oz. 10dwt. of gold and several ounces of silver to the ton. It is believed by those interested that the free gold would pay the expenses of the mine, and the pyrites remain clear as a handsome profit. Recently the Inspector was present when a parcel was treated, and 4cwt. No. 1 concentrates assayed 6oz. 8dwt. gold and 9dwts. silver per ton; No. 2 assayed 2oz. 17dwt. gold and 4dwt. silver per ton. A new find made recently at 50ft. from the surface, in a kaolinised sandstone, shows free gold to an extent that should be satisfactory to the shareholders. (1889.)

**MYPONGA.**—In May, 1886, the Government equipped a party of eighteen men to prospect for gold in the hundred of Myponga. They began on section 287, Meadows

Creek, near its junction with the Finniss, and in a line of shafts, varying in depth from 5ft. to 17ft., put across the creek, gold was found, but not in payable quantities. The eastern slope was tried within 100 yards of the creek, and a fair prospect was found in 4ft. sinking. In one shaft a small patch yielded about 1oz. 10dwts. of rough gold. Around this shaft a great number of others were sunk to depths of from 4ft. to 30ft., but no payable gold was found. A little distance below the junction of the Finniss and Meadows creeks some holes were put down to depths of 11ft. and 14ft., but greater depths could not be reached owing to the incoming of water. Some specks of gold were met with in the drift. Four hundred yards below this point a line of shafts was thrown across the river, and two distinct runs of gold were struck. Near Mount Compass shafts were sunk from 3ft. to 40ft. deep, and gold was found in nearly all. In the 40ft. shaft it was found in 17ft., on a false bottom. From that depth the sinking was through sand cement on to a granite bottom. Other trial shafts were put down in the neighborhood of Mount Compass, without result. Holes were also sunk down the river to about 300 yards below where Blackfellows Creek joins. Specks of gold were found in most of the holes. Returning to their starting point on the Meadows Creek, and prospecting northwards, the party obtained signs of gold in nearly every gully, but not in payable quantities. In Cooper's Gully a good prospect of shotty gold was got, but operations were greatly retarded by the large amount of water met with. At Lantern Flat, about one and a half mile north of the starting point, the party prospected places where two long gullies come into it. Some of the dirt yielded from 2dwts. to 3dwts. of gold per load. Prospecting operations were not carried beyond this point, as the party was disbanded. (1887.)

At a spot directly on the boundary of Myponga and Kuitpo a few yards square of surfacing has been prospected for gold. A trial washing yielded four or five specks. Since then nothing worth mentioning has been done, though the first prospects were fair. By making a race from the Finniss river a short distance above this point, water could be brought on and sluicing made use of during several months of the year. (1889.)

#### NEST-EGG MINE.—(See WOODSIDE.)

**NEW AJAX GOLD MINE.**—Forty acres, eight miles south-west of Waukaringa. A well-defined reef (reports the Inspector of Mines) can be traced for a considerable distance, and has been sunk upon in ten places, the shafts being from 30ft. to 120ft. deep. Course north-east and south-west, with an underlay north-west. Formation, layers of ferruginous quartz and chlorite slate. Samples taken by the inspector gave as high as 1oz. 4dwt. per ton; 100 tons tried at New Alma gave 10dwt. per ton. There has been a Government subsidy granted to assist in the development of this property. The Secretary (April, 1890) furnishes the following particulars:—The main vertical shaft is down to a depth of 170ft., and the principal underlay shaft 157ft. There are eight other shafts, varying in depth from 20ft. to 80ft. The strike of the lode is N.E. by E., and the dip 45° N.W., and the length of the drive 30ft. Width of lode 4ft. 6in., composed of ferruginous quartz and chlorite slate, and the country rock is calcareous slate and sandstone. The ore consists of oxide of iron and quartz, and assays have given results ranging from 10dwts. to 4oz. 8dwt., 6oz. 1dwt., and 7oz. 7dwt. per ton.

#### NEW BANKSIA GOLD MINE.—(See BANKSIA.)

#### NEW ERA GOLD MINE.—(See WOODSIDE.)

#### NEW NORTH CRYSTAL CALEDONIAN GOLD MINING SYNDICATE.—(See ECHUNGA.)

**NEW STIRLING REEF QUARTZ MINING VENTURE.**—Five gold leases, fifty-six acres, situate on Stirling Hill and the Onkaparinga River. The little work done has resulted unfavorably. (1887.)

**NEW VENTURE MINE.**—(See WOODSIDE.)

**NEW WEST WAUKARINGA GOLD MINING COMPANY.**—Gold-mining lease of section 550, twenty acres, Waukaringa. No records.

**NORTH NAIRNE GOLD MINE.**—This mine is not very far distant from Nairne railway station, and nearly adjoins the New Banksia. Mr. Parkes says that there is a large reef upon the property which requires capital for thorough prospecting. From 3dwts. to 4dwts. per ton can be obtained by trial crushings all through the reef, which is 10ft. thick at the 140ft. level, but pinches going south. At the 80ft. the reef averages 5ft. It has been estimated that under effective treatment the reef would yield an ounce per ton. The Inspector of Mines reports that the lease contains half a mile in length of reef, striking north and south, with a dip east at an angle of 10°. The drives opened and winzes sunk have exposed fully 11,000 tons of material. Numerous assays obtained have averaged 12dwts. per ton, and the gold is of high quality; and 5dwts. should pay the cost of breaking and extraction. This should become one of the leading gold mines, but the directors have for the present stopped working, wanting capital. (1890.)

**NORTH PARA RIVER.**—On section 586 a party of men tunnelling in the banks of this river, at the junction between the bed rock and the tertiary drift, got washdirt consisting of cemented gravel and boulders, and gold was obtained. The ground tried up to the date of the visit of the Government Geologist (1889) was not regarded as payable.

**NICHOL'S NOB MINE.**—This property, situated in the Farina district, was formerly worked as the Nichol's Nob Copper Mine, but prospectors examining the old dressing-floor, found fair prospects of gold. The Inspector of Mines reports that there is a strong well-defined lode bearing north 20° west and underlying north-east which carries a fair percentage of copper near the surface. It changes in character in depth the quartz cutting the copper almost entirely out, and carrying gold in a free state, with a kindly association of iron. The surrounding country is favorable for gold, and warrants further exploration and development. (1889.)

**OLARY MINE.**—This is situated about two and a half miles from Olary railway station, and encouraging assays for silver and gold are said to have been obtained. The Inspector of Mines reports that there is a strong lode which can be traced fully two miles, bearing east-north-east, and almost vertical, chiefly quartz, but at intervals making large silicious ironstone "blows." A good deal of work has been done, and a shaft sunk 110ft. is on a solid body of pyrites. Two assays showed 1dwt. 12grs., and 1dwt. 8grs. gold respectively to the ton. The auriferous pyrites are likely to become richer in depth. (1889.)

**OULNINA REEFS.**

These lie eighteen miles south-south-east of Mannahill, and the field was proclaimed under the name of the Wadnaminga Goldfield. Rich specimens of gold in quartz were obtained here in 1888, and a number of claims were taken up and amalgamated under the names of the Eiffel Tower, Golden Tower, Junction, Oulnina Tower, Victoria Tower, &c. There were 214 claims applied for, and it is believed more than 100 diggers were at work upon these reefs. At the south-west end there were in 1888 the following prospecting mines at work:—

**BIRTHDAY CLAIM.**—The Inspector of Mines reported recently:—The reef is being worked by stripping from the surface, and 100 tons raised, waiting treatment, showed a large quantity of gold. There is no fear of the reef either cutting out or becoming

poorer. It is about twenty-four miles from Mannahill and four miles from Eiffel Tower. Assay of samples taken promiscuously, 16oz. 16dwt. gold and 3oz. 12dwt. silver; and 6oz. 1dwt. gold and 18dwt. silver per ton. (1889.)

**EIFFEL TOWER CLAIM.**—In this property the strike of the reef is north-east, with southerly underlie. After sinking upon a small quartz reef for a short distance a vertical shaft was put down, which struck the lode at a depth of 30ft. Work was then suspended.

**EIFFEL TOWER NORTH.**—This was a prospect opened on a small auriferous vein, having a similar dip to the last-named claim.

**GOLDEN TOWER.**—This is on a reef striking E.N.E., with a dip 43° southerly. There is a small quartz vein which has been prospected, but we have no information of results.

**MCLEAN'S CLAIMS.**—Course of reef east and west; dip 25° to 35° south, and gold visible. There are three reefs in this property composed of cellular quartz and gossan, affording a good prospect. There is plenty of matrix to operate upon. (Inspector of Mines, 1889.)

**OULNINA TOWERS.**—The reef in this claim strikes north-easterly, and the dip is north-westerly. There is a vesicular quartz formation in small veins. No record of results.

**ONKAPARINGA DIGGINGS.**—(See ECHUNGA.)

**PALMER MINE.**—Adjoining Reedy Creek Mine. No particulars obtainable.

**PARLIAMENTARY CLAIM.**—(See WOODSIDE.)

**VICTORIA TOWER.**—This was on the McDonnell lode, and the outcrop of quartz was from 3ft. to 4ft. thick, and a crushing of 13cwt. taken to Melbourne is said to have yielded 126oz. of gold.

## PARA WIRRA GOLD REEFS.

**ALADDIN.**—A shaft was sunk 50ft. or 60ft. in slate, with a drive on a reef at the bottom, from which good prospects are said to have been obtained, but for some reason the stone was never tried. (1887.)

**EXCELSIOR.**—The stone from a hole on the cap of the reef is said to have yielded 8dwts. to the ton. There are two shafts, each 70ft. to 80ft. deep, and connected by a level at the bottom. They are sunk in a soft, decomposed slate, which near the bottom becomes blue and very hard. Some small ironstone leaders were cut in the south shaft. The quartz is very barren-looking and frequently contains a good deal of mica. (1887.)

**GODDARD,** on the same line, has a shaft 160ft. deep. A drive was put through slaty granite and gneissic rock to the reef, but no gold was found. (1887.)

**HAMLIN MINE** is on the same line as the Lady Alice and the Try Again Mines, but is on private property. A network of leaders were met with, but all too poor to work. Two or three shafts were sunk to the north, but no payable quartz found. (1887.)

**LADY ALICE GOLD MINE** is situated in Hamlin's Gully. The main reef strikes about  $10^{\circ}$  east of north, and underlies to the east; but it is either split by a "horse" or crossed by a smaller reef, which underlies to the north-east. This smaller reef carried the rich stone, both in gold and copper, the latter in the form of sulphides, oxides, and native copper. The only place where the spur reef came to the surface is on the north side of the gully, and it was at this spot that the gold was first discovered. When the deep vertical shaft was sunk, this reef was passed through at 30ft., but the sinking was continued to 160ft., and the main reef was struck at 100ft. Three levels were put in from the shaft to the junction of the reefs, at 50ft. and 100ft., and again at 160ft. A rise was carried up 400ft. on the spur reef to a point on the hill a little to the S.E. of the main shaft. From this the mine was subsequently worked. The upper part of the reef has all been stoped. The captains who at different times had charge of this mine did not know the country, and devoted most of their time to working the main reef. This, except at the junction, was very poor in gold; and the spur reef, consisting of payable stone, was worked by tributors. The mine in 1886 had water in it to within 14ft. of the surface; but it is said that the 6in. pumps now in the mine are capable of keeping it under. The mine was discovered in 1881, but a company subsequently formed failed to make the mine pay. During six months of 1874 the mine was worked on tribute, and yielded 1,149ozs. 19dwts. 2½grs. of gold. The value of the copper produced at the same time was £208 2s. 8d. From the floating of the company in 1873 to its winding up in 1879 the value of the gold obtained was £22,000, and of copper £4,000. The bed rock in the neighborhood has a general strike of north and south. It consists of gneissic granite, feldspathic schist, quartzose, and micaceous and hornblendic schist, yellow feldspathic rock, with quartz in rounded pieces. Gneissic granite is the prevailing rock. About £7,000 has been spent on this mine, and the Government have subsidized the work done. It was stated by the manager at the last half-yearly meeting, that a new discovery of gold had been made in a drive going towards the junction of the main with the spur reef, and that the copper bagged showed at least 2oz. of gold to the ton. The Inspector of Mines says there are two reefs, the main one going north and south; that the ground is totally untried in depth, and that the upper levels yielded ore of value. Mr. Scarfe, the secretary, says (1890) the following is the work being done by the present company:—Sinking vertical shaft 250ft.; driving crosscut west to reef 90ft., and driving is now proceeding along its course with the idea of picking up the junction of the spur with the main reef at 250ft. from the surface in new ground.

**LADY EDITH MINE** is to the south of the Lady Alice, on the main line of reef. The shaft was sunk 260ft., through very hard granitoid and gneissic rock, but the reef did not carry a payable amount of gold. (1887).

**SMITHFIELD.**—Another mine on the same line of country, worked without success. (1887.)

**TECA MINE** is at the head of the Lady Alice claim in the northern branch of the gully. There is no reef visible, but a drive was put into the hill for a distance of 200ft. or 300ft., and a shaft was sunk in the gully to a depth of 70ft. in the slate rock. No reef was cut. (1887.)

**TRY AGAIN MINE** is on the north side of the creek, and is on a continuation of the Lady Alice reef. At this point it splits into a network of leaders, three of which are the principal ones. In 1871, G. Davy and others found a rich patch of surfacing, beneath which were gold-bearing leaders. These were followed down to a depth of 40ft., when copper ore was met with, associated with gold. A company was formed, winding and crushing machinery was erected, and a shaft was sunk 250ft. Several small leaders were struck by cross-cuts from the shaft, one of which, a foot in thickness, contained copper ore and gold. The mine is now abandoned. (1887.)

**YOUNG AUSTRALIAN.**—This is an amalgamation of four claims. It is situated on



private property, just below the Lady Alice Mine, and has three principal parallel reefs. The one nearest the Lady Alice is named the Young Queen, and was opened up about seventeen years ago. Two shafts 20ft. deep were sunk, and a cutting in very hard slaty rock was made; but though good prospects were obtained the work was discontinued. The reef strikes first 10° east of north, then north-west. (1887.)

Upon the next reef, the NEW YEAR'S EVE, a shaft was put down 20ft. in yellow slate. The reef is small, but has veins containing much fine gold. Very good prospects and specimens were obtained, and a trial crushing at Woodside is said to have given 12dwts. to 16dwts. per ton. (1887.)

YOUNG AUSTRALIAN No. 1 has been worked from a cutting and a shaft 30ft. or 40ft. deep. The reef is from 4ft. to 5ft. in width, and well defined, containing manganese, native copper, copper pyrites, galena, baryta, calcite, carbonate of iron, and iron pyrites. It was rich on the hanging wall, and contained coarse, almost nuggety gold. Several other shafts have been put down, the deepest being 26ft. Forty tons of stones were crushed at the Lady Alice battery, but the results were not made public. The rock is an altered sandy clayslate, dipping 45° east. (1887.)

YOUNG AUSTRALIAN No. 2 adjoins the New Year's Eve claim on the north. It includes a flat in Wild Dog Gully, from which a good deal of alluvial gold was got. A hole was sunk on a network of ferruginous quartz leaders, which proved to be very rich in gold. One piece nearly all gold, weighed 16dwts., and as much as 1oz. 3dwts. was got from a prospect crushed in a mortar. A shaft was sunk 44ft. in settled ground to cut the reef, which is large, glassy, and crystalline, often much iron-stained, but carrying no gold. (1887.)

YOUNG AUSTRALIAN No. 3 is situated to the north of No. 1. The reef is 16ft. wide, and has been worked by a large excavation to a depth of 20ft. A crushing of 5 tons went 12dwts. to the ton. Mr. F. C. Singleton stated that £1,400 worth of alluvial gold was got from the sections comprising the "Young Australian" property. (1887.)

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PAPE'S CLAIMS.—Situation, near Mingary Mine. No information obtainable.

PEAKE GOLDFIELD.—Some time ago the Government Geologist examined and prospected a place on the Neales river, where some years before gold was found. The locality is at a waterhole called Algebuckina, about sixteen miles north of the Peake telegraph station, where the track crosses the Neales. Only a few colors of gold were obtained at the time, and it was impossible, owing to the height of the water in the river, to prospect the most likely places. The discoverer, Biddle, was therefore provided with a month's rations, and left to continue the search as the water became lower, and succeeded in striking payable gold soon afterwards. A number of men have worked on the field since then with varying success. As far as can be ascertained, about 60ozs. of gold had been got up to March, 1887. During eleven weeks' work a party of three men got 13ozs. of gold; this appears to be the richest result obtained. Colors of gold have been found over an area of country extending from Mount Dutton to Coppertop Hill, a distance of thirty-five miles. The extent of country available for prospecting is comprised within the Dennison, Peake, and other ranges to the northward, which outcrop in isolated areas from beneath mesozoic plains, and along the courses of the Neales and other rivers where they have cut into the bedrock. The auriferous area is therefore comparatively limited. The Government Geologist visited and reported in July, 1889, and expressed a very favorable opinion of the Neales district as a place where auriferous deposits might be found.

Later Mr. Samuel Dyke, in charge of a Government party, was sent by the Government Geologist to bottom certain shafts in the River Neales, Algebuckina. He reported having bottomed Shafts Nos. 1 to 4, but without meeting with any gold except a few fine colors in the course of sinking; that the water in every case rose to within 4ft. of the surface, making about 3,000 gallons per hour after a depth of about 10ft. was reached. This proved the valley for about one-third of its width. The Government then decided to discontinue the workings, which were consequently abandoned. The principal place where the alluvial gold has been worked is along the conglomerate escarpment bordering the Neales River. Small quantities of this metal have also been found up the valley of the Neales and in gullies at Mount Dutton.

**PHOENIX GOLD MINING COMPANY.—(See ECHUNGA.)**

**PIMPONDA.**—The Inspector of Mines states that this mine is situated about one mile west of Old Boolcoomatta Station. The proprietors hold six mineral claims and fifteen gold leases. The country is made rugged by intrusive granite, and there are large dioritic dykes traversing it and the clay slate. A reef in No. 1 shaft is composed of quartz and copper, and specks of gold can be discerned; and in No. 2 shaft good prospects of gold are obtainable from an iron and copper branch varying from 8in. to 18in. in thickness. Gold was not found until sinking reached a depth of 25ft. The outcrop of reef is well defined, and continues for two miles. After a much more recent visit the Inspector reported that, in the hill shaft, at a depth of 61ft. a strong body of quartz had been exposed, and that a parcel of the stone tried gave the return of 1½oz. to the ton. (1889.)

**PLANE & RIDDLE'S MINE.—(See ECHUNGA.)**

**QUEEN BEE GOLD MINE.**—Situate at New Luxemburg, adjoining the Mingary Mine; area, 1,200ft. on the line of reef by 600ft. wide. The reefs on the claims run parallel in a north-easterly direction for a distance of about 800ft., and then attain a width of 7ft. or 8ft. in places. The Inspector of Mines, in reporting on this property, states that the rocks of the locality are metamorphic and intrusive, and it is probable that besides the eruptive granite, dioritic dykes will be found in sinking. The geological structure of the country is very similar to that of the Barrier, and is a continuation of the same formation. The reefs are situated near the boundary of the granite and metamorphic rocks and the slate. The formation is also similar to the Yudnamutana and Neales River districts where gold has been found. The quartz lodes in this locality are the largest, best developed, and most permanent in appearance yet discovered to be auriferous in the north-east, and a low average yield of gold will pay better than a high average where the reefs are small. The Inspector of Mines also reported, as a result of a recent visit to this mine, that on a strong outcrop of quartz three shafts have been sunk. Samples panned off showed excellent prospects. The reef carries bunches of carbonate of copper, and free gold can be seen in the stone. The average width of the reef is 3ft. 6in., with a dip of 1ft. in 22ft. Samples selected by the Inspector gave an average of 1½ozs. per ton. Samples taken on a second visit, and assayed by the Government Assayer gave (1) copper 35½ per cent., gold 16grs.; (2) copper 27½ per cent., gold 2dwts. 6grs.; (3) copper 18 per cent., gold 10dwts. 10grs.; and (4) copper 3½ per cent., gold 4dwts. 2grs. During the present year the Inspector once more took a note of operations, and at the time of his visit ore was being raised and bagged, the last parcel sent assaying in bulk 1oz. 10dwts. gold, and 9ozs. silver per ton, with 32½ per cent. of copper. T. A. Masey, Esq., states that returns from ore sold are highly satisfactory, and that a specimen of quartz showing gold obtained at the depth of 105ft. assayed 16ozs. 3dwts. to the ton, and that all the reefs on the property have been proved to be auriferous.

## REEFS NEAR PUTT'S WELL.

The Government Geologist reported on the auriferous reefs near Putt's Well, August 21st, 1888:—These reefs are situated about one and a half miles north of Putt's Well, near Oonatra Creek, on the Boolcomatta run, twenty-five miles north-west of Mingary railway-station. Claims have been taken up for about 1,000 yards along the line of reef in an east and west direction. At the western end the first workings are those of Messrs. Crozier & Sheppard, who hold six claims. There are small veins of quartz and gossan, with calcareous and argillaceous material, stained green with carbonate of copper, varying in width from an inch or two to a foot. The bed rock consists of feldsite, containing both mica and hornblende, evidently a metamorphic rock which has been altered by the intrusion of eruptive granite dykes. From another shaft about 30ft. deep, where there are two small perpendicular veins in similar rock, a crushing of four tons is said to have been raised and sent to Woodside. These veins are small, and composed of quartz, iron oxide, and gossan. The bed rocks are schistose, gneissic, feldspathic, and micaceous rocks, with eruptive dykes of granite. Sullivan, Mathews, and Legge's claims come next. Sufficient work has not been done to prove anything here, the shallow holes which have been sunk having exposed only thin copper-stained veins of quartz and gossan of an irregular and uncertain nature. For the next 1,400ft. there is no reef showing, the ground being chiefly occupied by coarse eruptive granite, which appears to have cut out the reefs. At that distance there is a silicious reef in micaceous sandstone and slate with granite veins; also 700ft. further on there is a still larger outcrop of similar rock close to the granite boundary. Both appear likely to contain gold. Walsh and Legge's claims are the last on the line where any appreciable work has been done. Two shafts have been sunk to depths of about 14ft. each. There is a large vein formation here, and besides the gossan and other iron oxide some rich copper ore has been obtained. Eastward of these claims the eruptive granite takes the place of the metamorphic rocks. I found it difficult to discover any gold in the veinstone from these claims except by crushing and washing, although I have been shown moderately rich specimens of auriferous quartz by reliable persons which had been obtained there. Very little work has been done to prove the nature of the veins. So far as they have been followed up they are small and irregular, but more prospecting is required before it would be safe to say that larger and richer veins do not exist in the locality. The general rock formation of the country is gneissic granite, mica schist, micaceous slate, and sandstone, with eruptive dykes, and bosses of granite. The latter rock is, in the neighborhood of the reefs, much mixed up and intruded into the metamorphic rocks in which the auriferous veins occur, so that the latter may be expected to be irregular and uncertain. It is advisable, however, that the present veins should be sunk on to greater depths and more fully prospected, and that the silicious reef outcrops in the neighborhood should be tested. The following assays of rough averages from the veinstone raised and lying near the shafts have been made by Mr. G. Goyder, jun.:—

**CROZIER & SHEPPERD'S CLAIMS.**—No. 1, quartz and gossan, gold, 2dwts. 16grs. per ton. No. 2, quartz and gossan, gold, 6dwts. 13grs. per ton. No. 3, quartz, gold, 2dwts. 16grs..

**LEGGE & WALSH'S CLAIMS.**—No. 1, quartz and gossan, gold, 1dwt. 2grs. per ton. No. 2, quartz and gossan, gold, 2dwts. 14grs. to the ton. At the time of the visit only three men were at work at the reefs. There is a great supply of drinking water at Putt's Well. The ranges here are steep and high, and the gullies consequently narrow and well defined, and easily tested for alluvial gold, which up to the present has not been searched for, but its presence is probable. In passing the Government Geologist had an opportunity of visiting a few of the neighboring mines.

**QUARTZ BLOW.**—(See ECHUNGA.)

**QUEEN MINE.**—(See ECHUNGA.)**RED HILL GOLD MINING COMPANY.**—(See BAROSSA GOLDFIELD.)

**REEDY CREEK GOLD MINING SYNDICATE.**—Area and locality, about 538 acres, at Palmer, held on lease for twenty-one years on a royalty of 5 per cent. Captain Angel kindly supplies the following particulars:—There are several lodes on the property, one of which (Masterman's) is 30ft. wide; and there are three shafts respectively, 420ft., 90ft., and 40ft. The ore is pyrites, the bulk assays averaging 1oz. 4dwts. per ton. The mine was opened many years ago as a copper venture, but there was a stoppage of working until comparatively recently, when it was discovered that the pyrites were rich in gold. It is now being worked by an English company. The manager states that there are nine lodes on the property, five striking east and west, and the others north and south. One lode is 18ft. wide, one 10ft. one 8ft., and six average 5ft. There are six shafts, one being 420ft. deep, following the dip of the lode; two are vertical, 240ft. and 180ft. respectively. The total length of drives is 3,068ft. The matrix of the ore is quartz; country, granite and schists, the lode carrying iron pyrites, yielding 17dwts. gold per ton. Adjoining mines are named Palmer, Golden Gate, and South Reedy Creek. (1890.)

**RIDGE GOLD MINE.**—(See WOODSIDE.)

**RISCHBEITH'S WELL.**—During 1888 gold was reported to have been discovered at Rischbeith's Well, about forty miles south-west of Hergott Springs. The rocks consist of inclined and twisted limestones, sandstone, and slate beds, intersected with quartz and iron oxide veins. One man was at work (January, 1889), and a few ounces of alluvial gold and specimens of gold in oxide of iron were shown—the alluvial gold from a small gully and the specimens from the neighborhood. Several claims were taken up in the locality, but what work was done in the way of mining on them is not known, nor have any payable results been reported.

**ROYAL CHARLIE GOLD MINE** is situated about seven miles south of Teetulpa. The workings consist of an underlay shaft sunk to a depth of 180ft., and a vertical shaft, 62ft. deep, connected with the underlay shaft. At 180ft. a drive has been put in for 25ft. or 30ft. along the reef, 5ft. in width, with a strike reef north and south. The veinstone consists of quartz and other silicious material, brown iron ore, gossan, and pyrites. The country rocks are clay and calcareous slates, and sandstone. Besides the main reef there are two cross veins striking E. and W. and S.S.E. respectively. Though the main reef is short, yet, owing to its great thickness, it has yielded a large quantity of crushing stuff. Assays of stone have given—(1) quartz, ironstone, and pyrites, gold, 4dwts. 1gr. per ton; (2) ditto, rough average from a heap, gold, 8dwts. 2gr. per ton; (3) ditto, ditto, gold, 1oz. per ton; (4) ironstone, gold, 2oz., silver, 13dwts. per ton; (5) ditto, gold, 33oz. 12dwts., and silver, 10oz. 2dwts. per ton; (6) ironstone and quartz, gold, 15oz. 13dwts. per ton. The only way to ascertain the average yield would be to have 20 tons treated by the most approved gold-saving appliances. As the gold is not visible in the stone before washing, it is impossible to judge what proportion of lode stuff is of the richness indicated by the assays. The Inspector of Mines reports later assays of samples of blanketings and tailings, 1oz. and 3dwts. respectively per ton; and, subsequently, that he had got as high as 4oz. per ton; and, also, that he had obtained an assay of 1oz. 5dwts. from the tailings pit. (1889.) It is stated that ten tons of auriferous stone have been sent to England, with a view of showing the character of the reefs.

**SEBASTOPOL MINE**, section 436, in the Waukaringa district, containing 30 acres. It has one shaft 100ft. deep, but there are no results to record.

**SELICK'S HILL**, hundred of Willunga, five miles south of the township of

Aldinga, and thirty miles south of Adelaide. A reef on the surface was reported to contain gold. An adit about 30 yards in length was driven from a gully about 200ft. below, but as the reef was not cut the work was abandoned. (1887.)

**SOUTH AUSTRALIAN MOUNT MORGAN.**—(See ECHUNGA.)

**SOUTH AUSTRALIAN PYRITES AND GOLD MINING COMPANY.**—Its properties, situated on the German reef, near Blumberg and Mount Pleasant, are held on lease for specific periods, varying in length. No records.

**SOUTH CRYSTAL GOLD MINING COMPANY.**—(See ECHUNGA.)

**STIRLING REEF MINE.**—(See ECHUNGA.)

**SUNNY SOUTH GOLD MINE.**—(See COMET.)

## HUNDRED OF TALUNGA.

Gold has been found here on private and Crown lands, and our information respecting the various prospects, with one exception, is not more recent than that given in the first edition of this work.

**BLACK SNAKE MINE**, on section 127, hundred of Talunga, was worked during some few years. It was taken up on the strength of some good specimens being found along the outcrop of the reef. Some of the stone was crushed, and is said to have yielded well. The reef runs E. 30° N., dipping to the west. Two timbered shafts were put down, and cut the reef at 60ft.; they were connected by a drive, and one shaft was, for some reason, sunk 30ft. deeper. An engine shaft was sunk 50ft. and timbered, and some shallower shafts were put down. This mine is now being worked in conjunction with the German Reef.

**BLUMBERG UNITED MINE**, section 6572, was being worked in February, 1886. Shafts have been sunk on several veins and reefs, and some surfacing has also been done, yielding excellent results. It is reported that 700zs. were obtained in a five acre patch of alluvial. (1889.)

**CRITERION REEF** is near Mount Torrens, in the hundred of Talunga. There are two reefs, one striking east and west and one north and south. The north and south reef is not, at present, being worked; the east and west reef underlays to the north at a rather flat angle. In width it varies from 1ft. to 3ft., and is buncy in character. This reef was worked many years ago, but the results were not payable, and the mine was idle for some years. More recently work has been resumed. A shaft has been sunk to a depth of 50ft., and a drive of 50ft. has been put in. Twenty-five tons of stone have been raised and have been crushed at the New Era Battery, Woodside. The yield of gold was about 12dwts. to the ton. Information concerning the original operations conducted in this mine has not been forthcoming.

**DURDAN MINE** is on section No. 6343, a mile and a-half east of Blumberg, hundred of Talunga. It contains one lode, bearing north and south, dipping easterly, one foot in five, and varying in width from 10ft to 14ft. The ore is auriferous quartz, occurring in patches, with fine gold distributed through the whole of the reef, and in some places in the surrounding country. The average yield of gold to the ton was over 1oz., value £3 12s. 6d. per ounce. The auriferous veinstone consists of cellular and solid quartz, penetrating a greenish serpentine granite which has intruded into meta-

morphic sandstone and micaceous slates. One vertical shaft has been sunk to a depth of 100ft., and the water level was reached at 90ft. The drives extend a distance of 90ft. What has been done upon this property is not sufficient to accurately test the real value of the lode. The Inspector of Mines, visiting it in July, 1889, says the mine has been worked in a primitive manner for many years, and capital is wanted for machinery. The adjacent ranges will become the scene of gold mining as the principal industry at no distant date, and the surface quartz yields results that should encourage deep sinking. Samples from reef in No. 1 shaft, vertical and 100ft. deep, gave under the analysis of the Government Assayer 7oz. 12dwt. per ton. The reef is proved at the 35ft. and the 80ft. levels. The reefs are principally quartz and remarkably free from base metal, but the gold, being very fine, requires careful treatment. A sample from the 35ft. level gave 4oz. 7dwt. to the ton. There are 400 tons on the surface that would pay for treatment. Ground easy to work, and with the natural facilities available, an average return of 12dwt. (a low estimate) should pay handsomely.

**DUSCOVITCHE'S REEF** is on section 6339. A few years ago rich specimens of gold were found in a quartz reef about 3ft. wide.

**ELDER'S SECTION, No. 125.**—Here a 40ft. shaft was put down at the junction of two reefs, one of these is about 2ft. wide, well defined, strike S.W. and N.E., dipping N.W. 45°; the other is a solid white quartz reef, striking S.E. and N.W.

**GERMAN REEF MINE** is situated on section 7118, hundred of Talunga, twenty-six miles N.E. of Adelaide, in a direct line. The reef, showing a well-defined outcrop for more than twenty chains in length, strikes N. 15° E., and dips W. 15° N. The rocks traversed by it strike N. 40° E., and dip W. 20° N., and consist of highly micaceous metamorphic sandstone, alternating with mica schist. Gold was found in the outcrop for a distance of at least ten chains, and in two places was extremely rich. At one of these places, low down on the slope of a long hill, the reef has been worked on the underlay to a depth of about 40ft., and for a distance of about 100ft. in length. Tolerably well-defined walls show in the faces, and an alternately flat and steep dip. The thickness of the portion removed varied from 2ft. to 6ft., but the quartz became poorer in depth, the last raised averaging from 3dwts. to 5dwts. per ton. The second place where rich gold was found is on the top of the hill, but here the outcrop has been partially worked. A vertical shaft was put down at this spot, and the reef was struck at a depth of 90ft. to 100ft.; but it proved to be poor, and was only 6in. thick, while on top it ranged in places from 2ft. to 5ft. All along the outcrop the quartz is rich in iron pyrites, and some, by its cellular texture and very ferruginous character, shows that much of this ore has been decomposed. The pyrites becomes still more abundant in depth, and fine seamy quartz raised from the vertical shaft contains it at the rate of 25 per cent. to 30 per cent. In similar cases in Victoria, namely the increase of pyrites and the decrease of free gold in depth, it has been found that the pyrites is payable, and sometimes richly auriferous. (Ulrich, 1872.) This mine had stopped working at the time of Professor Ulrich's visit, but arrangements were subsequently negotiated to work the ores under a system different to that hitherto pursued. A Frew ore concentrator, for the purpose of concentrating the pyrites contained in the tailings after the ore has been crushed, was proposed. The pyrites will be treated by roasting and chlorination for the extraction of the gold. Mr. A. Caudan, the manager, reported (March, 1887) that about fifty tons of highly ferruginous stone have been raised from a depth of 30ft. It contains limonite, and sulphides of iron; gold often visible, but very fine, and yielding on assay from 1oz. to 3ozs. or 4ozs. per ton. At the north end of the section the stone carries fine grained oxide of iron, with magnetic iron and silver combined. In the oxide of iron the gold is of a coarse description. The dip of the reef is westerly throughout, but the angle varies in every few feet in depth. The rocks forming the country are metamorphic quartzite and sandstone, mica schist, mica slate, and sandstone traversed

by dykes of coarse granite. In 1870-1. the English, Scottish, and Australian Chartered Bank bought gold obtained from this reef to the extent of 395ozs. 13dwts. 5grs., equal in value to £1,527 2s. 8d. The Black Snake reef is being worked in conjunction with the German reef. No recent information.

**McVITTIE'S HILL**, section 1340.—Here two or three shafts have been sunk on a quartz reef; their depths range from 40ft. to 60ft. The place was worked about seventeen years ago, and the yield of gold per ton is said to have been 10ozs. 11dwts. Gold can be seen in some of the fragments of quartz lying near the shafts. This mine was known as McLean's Triumph.

**MOUNT PLEASANT DIGGINGS**.—Sections 1287, 1288, 1289, &c., are Crown lands, and are situated about one mile south of the township of Mount Pleasant, from which the diggings derive their title. Two long gullies have been worked for alluvial gold, and several shafts have been sunk on the bedrock in prospecting for quartz reefs. The works were carried on about nineteen years ago, and it has been impossible to get information respecting the total amount of gold procured. However, Mr. Dutton, manager of the bank of South Australia, Mount Pleasant, states that from February, 1870, to July, 1883, 729ozs. of gold from this field passed through the bank. The E. S. & A. C. Bank bought 360ozs., value £1,374 17s., during the same period.

Alluvial gold has been found in—

**SECTION 6572** and in section 1673, adjoining the section in which the Durdan Mine is situated.

**SECTIONS 6396, 6624, 6625, and 116** have also been worked for alluvial gold. Those of the sections which belong to the South Australian Company yielded the following amount of gold:—

		Ozs.		Value
Section 6625	.....	Gold 58	....	232
" 6624	.....	" 199	....	" 796
" 6558	.....	" 77	....	" 306
" 6511	.....	" 414	....	" 1,648
		<u>748</u>		<u>£2,981</u>

**SECTION 6558**.—From a small patch of surfacing 77ozs. of gold, value £305, was obtained. Numerous shafts have been sunk in prospecting for the reefs, and quartz from one of these is said to have yielded 9½dwts. of gold to the ton.

**SECTION 6511**.—Small patches of surfacing were worked in a shallow alluvial gully. During the last five months of 1885, Messrs. Facett and Garland obtained 126ozs. 10dwts. of gold, equal in value to £504. No work is now (Feb., 1886) being done owing to want of water for washing. Three or four shafts have been sunk on the section to prospect quartz lodes, but with what result could not be ascertained. The prevailing rocks are mica schist and quartzite, with coarse granite dykes and quartz veins.

**PENRHYN MINE**, section 6332.—Rich surfacing was got here. Shafts were sunk on quartz reefs in the vicinity, but no payable stone was found.

**PORT ADELAIDE SYNDICATE**.—The property prospected is Crown lands at McVittie's Hill, and in the middle of April, 1890, at a depth of 35ft., a reef 18in. thick was struck, showing free gold, and affording very great promise.

Numerous reefs in this hundred (Talunga) have been prospected by shafts, and near the surface nice specimens of gold in quartz have been obtained; but none of them appear to have been prospected to any great depth—not more than 100ft. probably. (1887.)

On section 1673, Aboriginal Reserve, and on section 5343, hundred Talunga, alluvial gold has been found.

### TEETULPA GOLDFIELDS

Are situated about fifteen miles east of Waukaringa, and about twelve miles north of the Birthday Reef, at Mannahill. They were discovered by Thos. Brady, of Lancelot, and Thos. Smith, of Broughton, on October 6th, 1886. The first gold was found in the centre of the gully now known as "Brady's." Several pieces, weighing in all about 1½ozs., were dug out of the cracks in the slate by Smith, using his knife only. The prospectors put in their claim to the Government reward of £1,000. A rush from Adelaide and great excitement followed, and a working population numbering at one time about 4,000 to 5,000 people occupied the field. The prospectors took out their reward claims (ten in number) at the spot where they had found the first gold; other claims were quickly pegged out, following the creek in a northerly direction for a distance of half a mile. The first nugget of any size was found by McDougall and Opperman, and weighed 8oz. 14dwts. The largest nugget known to be found on the field was got by Horner, in a claim about twenty yards north of Brady's claim. It weighed 29oz. 15dwts. Other nuggets, of 14oz. 16dwts., 13oz., 10oz., and smaller sizes were found more frequently. Work on the field was hindered by the want of water. All the dirt had to be carted to Tonkin's Well, a distance of about two miles. The results from washing were variable, ranging from 1dwt. or 2dwts. up to 4oz. per load of dirt. For a time the digging was confined to the bed of the creek, where heavy floods had washed away the earth to a depth of 4ft. Here the claims were easily worked. As a rule the earth and gravel were broken up by the pick and then fossicked over with a knife. Every gutter and crevice in the slate beds was carefully cleaned, and it was in these that the nuggets were most frequently found. About 27th October, however, some holes were put down in the high ground on the west side of the watercourse. Here the sinking was from 18ft. to 25ft. deep. A good wash was met with about 18in. from the bottom, and in many claims the yield was very rich indeed. This locality was named Windlass Hill. From one claim the owner states he got £700 worth of gold during a period of five or six weeks, and afterwards sold his claim for £50. On the 31st October a rush took place to the upper part of the gully, south of the protectors' claims. This was caused by a man finding a 15dwt. nugget, together with 5dwts. of small gold. This part of the gully had been tried previously, but nothing had been found in it. This discovery, however, put more heart into the miners, and the gully was soon tested in every part. It proved to be very rich. Nuggets weighing from 14oz. downwards were found in many claims, and some of the washings were very good. Here the sinking averaged about 8ft. The gully was not more than four claims broad; the gold lay in gutters and pockets, and from one of these as much as 19oz. has been taken. The following is a list of the nuggets bought by the Government. It includes the heaviest pieces found on the field up to the present time:—

Where found.		Weight.	Price paid.
		oz. dwt. grs.	£ s. d.
BRADY'S GULLY.—Three claims north of prospector's claim....		29 15 0	120 0 0
"	"	21 8 0	80 4 0
"	"	19 7 5	78 19 7
"	"	13 12 22	51 3 0
"	"	8 14 0	34 16 0
"	"	10 9 0	41 16 0
"	"	3 7 18	13 11 0
"	"	3 12 2	13 10 4
"	"	3 3 12	11 17 0
"	"	1 10 0	5 12 6
"	South of prospectors' claims .....	14 13 8	55 0 0
"	"	9 2 0	34 2 6
"	"	6 6 18	24 11 1





**PLIOCENE LEADS.**—Northwards of where Brady's Gully runs on to the Salt Creek Flats there is a table-land of drift, known to diggers as "made ground," similar in character to that of Para Wirra, Barossa, Echunga, and other parts of the main range. It is most probable that gold will be found by prospecting it. Work has been done here and "colors" are said to have been obtained, but operations have been suspended, as no payable results were quickly forthcoming. This drift extends northwards towards Mount Victor, in the neighborhood of which there are gravel-capped rises indicating its presence. It may also pass under the Salt Creek alluvial flats. Over a year ago (1887) several shafts were sunk, on the recommendation of the Government Geologist, commencing at a point near Salt Creek, where the bed rock was met with about 10ft. from the surface, and extending westward across the plateau. These shafts appear on inspection not to have been bottomed, but to have been abandoned on reaching a hard calcareous cement and conglomerate; the question, therefore, as to the existence of a lead of gold is still undecided. The finding of deep ground and payable gold here would be a matter of great importance, as there is a large area to the northward of similar country.

The ranges near Bumbumie—to the east of Brady's Gully—consist of gneis, mica schist, granite, &c., and these are penetrated by granite dykes and masses, and probably by diorite, as this and other hornblendic rocks are seen in the creeks. The calcareous slates and limestone dip away from the granite and metamorphic rocks at a low angle. Some of the slates contain boulders and pebbles of quartzite embedded in them. A large portion of the nuggets found on this field show no sign of having been derived from quartz reefs. Most of them are partially coated, and have their hollows filled, with travertine limestone; ferruginous limestone rock and iron oxide is frequently found adhering to them. The veinstones found in the district consist chiefly of quartz, iron ore and limestone also occur, either combined or separately. Auriferous wash dirt, cemented with carbonate of lime, is also found; it is a hard rock, and the gold is not visible on the surface. Payable gold may sometimes be passed over, if the cement is not carefully examined. There is also a probability of small nuggets becoming completely coated with the travertine limestone, and so being passed unnoticed. This material may be removed from the gold by placing it in a solution of spirits of salt, or by heating it in a fire and converting the carbonate of lime into quicklime.

**STRAWBRIDGE'S GULLY** was opened early in November. It lay south of Brady's, and ran in a north-easterly direction, emptying near Tonkin's Well. It was a most likely-looking place for gold, and was worked for some weeks. One man obtained a pocket holding over 60zs., including a nugget of 50zs. 5dwts.; but, with that exception, nothing more than fair prospects were obtained.

**TEETULPA REEFS.**—There are two sets of reefs or veins in this district; one traversing the bed rock in an east and west direction, and the other striking in a meridional direction. They are composed of veinstone consisting of quartz, gossan, carbonates of lime and iron, hematite, brown iron ore, and iron pyrites. Carbonate of bismuth and lead, with traces of copper ore, have also been noticed. So far the greater part of the work done has been on the north and south reefs. These have a strike ranging from north  $10^{\circ}$  to  $15^{\circ}$  and  $20^{\circ}$  west; the underlay is steep, and inclines from  $70^{\circ}$  to  $80^{\circ}$  to the east. They are well defined, and are of considerable width in some of the claims, and have well defined walls. They run parallel to one another in groups of three or four. Numerous shafts have been sunk, the greatest depth at present attained being about 70ft. As a rule the gold is very fine, and, owing to the ferruginous nature of the stone, is very difficult to see. In the Victoria claim, however, a pocket consisting of quartz and gossan has been found containing very rich specimens of a wiry, filamentous gold of a peculiar and remarkable character. Other claims in which gold has been seen are Meache's, Ironclad, No. 1 and 2; and on the Ironclad belt of reefs, the Jubilee, Blue Star,

**Warrior, &c.** Owing to the nature of the stone its value cannot be judged merely by examination, and so far no crushings have been made. Assays and hand crushings have been resorted to, but the former are often deceptive, and the latter test is generally only sufficient to show that gold does, or does not, exist in the small samples tried.

**VICTORY GOLD MINING COMPANY.**—Area and locality, 400ft. by 800ft., at the head of Goslin's Gully, adjoining the Blue Star and Jubilee reefs. No records.

**WAKEFIELD GULLY** ran into Brennan's also, but above the prospectors' claims. Not very much work was done here.

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**SOUTH REEDY CREEK MINE.**—Adjoining Reedy Creek Mine. No records.

**STIRLING REEF COMPANY.**—No records of work done, but the company was in existence about 1872.

**TAMBAROORA LINE OF REEFS**, situated near Hahndorf, were worked in the year 1871-2, but there are no records extant.

**TORRENS RIVER.**—For some few months a number of men worked for gold at a spot about two miles above the gorge, where the Sixth Creek comes in, and also along the bed of that creek. Alluvial gold has been found in the river by sluicing, on section No. 6154, near the Gumeracha bridge, and on sections Nos. 6074, 6060, 6113, and for some distance along the river near Blumberg, and elsewhere. What portions will prove payable can only be ascertained by thorough work. The river is auriferous from its source to the gorge where it issues from the hills, and from thence it has probably carried gold down towards the sea. This can only be proved by testing the deep tertiary deposits on the Adelaide plains. (1887.)

**TRENGOFF GOLD AND SILVER PROPERTY.**—This claim is situate about a mile and a half from Angaston, at the base of a large hill of marble, traversed by a dioritic dyke. The Inspector of Mines states that at the point of intersection of the diorite and the marble there is a "blow" of specular and oxide iron. There is a lode formation apparently fully 25ft. wide, and stones said to have been obtained at a depth of 30ft. showed free gold in the vughs. The appliances are inadequate to keep the water under, and so sinking is retarded. (1889.)

**TREVUE MINE**, four miles east of Gawler, on the private property of Hon. James Martin, M.L.C. The Inspector of Mines reports that on the top of a hill of clay slate there has been sunk a shaft disclosing a reef, which runs north and south, and underlies westward, but the strata are contorted. A shaft, 90ft., cut several quartz leaders, mostly mineralized, and a crosscut has been put in the bottom of the shaft, but has not cut the reef, which is slightly auriferous. (1889.)

**TROJAN GOLD MINING COMPANY.**—(See MANNAHILL).

**TWIGHAM DIGGINGS.**—About two miles eastward of the Ulooloo diggings a small patch of alluvium has been worked for gold. There is no information available as to results obtained. (1886.)

**TWO-IN-THE-BUSH MINE.**—(See WOODSIDE.)

**UNION JACK GOLD MINING SYNDICATE.**—Area and locality, eight claims, total 800ft. by 600ft. on the Ajax Reef, Waukaringa. No records.

**ULOOLOO GOLDFIELD.**

This auriferous area is situated about twenty miles north of Hallett, in the hundred of Hallett. It was discovered in 1870-1, and the first workings were on section No. 650, on what is known as the White Lead. Workings were also opened on Noltenius's Creek, sec. 673, and were followed down on to Coglin's Creek. Since the discovery, work has been carried on in an intermittent manner. It has been impossible to ascertain the total quantity of gold obtained; but £18,000 worth was, up to August, 1886, transmitted through the post office at Hallett—the nearest township. No quartz reefs or veins have been worked, the gold found being alluvial, and generally coated and mixed with iron ore. Along Coglin's Creek the gold is found in two formations—the alluvium of the present creek, and in the old creek-bed or deep lead, following the creek and sometimes crossing it. In the present creek the sinking was only a few inches in depth, whilst in the deep lead it ranged from 20ft. to 30ft. Both the lead and the creek follow the strike of the rocks, viz., north and south. Some parts of the diggings were fairly rich. Attempts to prospect some of the deep leads have been frustrated by the great influx of water at about 40ft., but this could be overcome by pumping. The absence of water, except in the Ulooloo Creek, is a drawback to efficient prospecting, and another matter that is against the success of the field is, that the area of Crown lands is small and is surrounded by freeholds. The neighboring country is strongly auriferous. With regard to results obtained by miners, the Warden of Goldfields reported on July 5th, 1886, that Ellis and Carpenter had washed 11ozs. of gold from seventeen loads of dirt, and that Herbert's party had washed 5ozs. from two and a half loads. The Government prospecting party got various amounts of gold, ranging from 2dwts. up to 13dwts. per load. The gold found is coarse and nuggety, and some but little waterworn.

The rocks of this field consist of clay and calcareous slates and limestones, with quartzose, sandstone, and sandstone bands. They contain numerous reefs and veins of quartz and ironstone, and the surface is frequently strewn with fragments of these veinstones.

The Government Geologist visited this field in April, 1888, and found that an iron ore and gossan vein was being followed down by an underlay (40°) shaft to a depth of 70ft., the lode being small but strong and well defined, varying from a few inches to a foot in width. A sample from the bottom of the shaft assayed 1oz. 2dwt. 20grs. per ton, and from a crosscut above 6dwts. 12grs. silver. A shaft was also being sunk to cut a thin vein of ferrocalcite containing galena. There are numerous other veins in the neighborhood, but they are too narrow to make it advisable to spend money in prospecting on them.

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**URAILLA GOLDFIELDS.**—A local correspondent writing on August 13th, 1889, stated that one party of three men worked about four days, and obtained 6ozs. of gold; and that most of the best gold had been got near the leaders, several of which cross the gully. Where the gold was found most there was more iron in the dirt. The sinking on the side of the hill averaged only about 12ft. The gold has not been confined to a small lead, but has apparently been spread over the bottom, and so the diggers

are working their claims out all round. The flats are thought to be also rich, and portions have been tested.

**URAIDLA MINE** is on section No. 128, hundred Onkaparinga. Tunnels have been driven into the rock, but there is no evidence to show how much gold, if any, was obtained. Large quartz veins outcrop in the neighborhood, and the place is a favorable one for gold. The rocks pierced by the tunnel are kaolinized clayslates and sandstones traversed by ferruginous quartz veins.

**VICTORIA HILL GOLD MINE.**—(See BAROSSA GOLDFIELD.)

**VICTORIA GOLD MINE.**—(See BAROSSA GOLDFIELD.)

**VICTORIA GOLD MINE** was opened by a company in January, 1846. The mine is ten miles east of Adelaide, and, as nearly as can be ascertained, in the neighborhood of the Montacute, and the property of the company comprised 147 acres of land. The *Royal South Australian Almanac*, 1848, gave the following account :

Soon after the operations of the company commenced, a vein of auriferous gossan was discovered in the principal shaft, and at length it was found impregnated with native gold of almost perfect purity. Genuine specimens of the gold soon adorned the cabinets of the curious, and the working jewellers of Adelaide were employed to mount South Australian gems in some of the virgin gold thus found in the province. The excitement was extreme: the £2 shares went rapidly up to £30 each, and the *fortunate* purchasers at the advanced price thought their fortunes were made. But all at once the prices were very much the appearance of blanks; a ruinous reaction ensued; the price of shares went down to £3 each.

This mine was not being worked in 1852.

**VICTORIA REEF.**—(See ECHUNGA.)

**VICTORY GOLD MINING COMPANY.**—(See TREETULPA.)

**WATERLOO CLAIM.**—The Inspector of Mines visited this claim in May, 1889, and reports that two shafts have been sunk on section 4232, near Hahndorf. A strong quartzite reef contains a fair percentage of slightly auriferous pyrites. The hanging-wall is sandstone and the footwall slate, both walls well defined.

**WATT'S GULLY.**—(See GUMERACHA.)

**WEST ALMA GOLD MINING COMPANY.**—Gold mining leases No. 437A and 552, Waukaringa. The property adjoins the Alma Extended and the Day Dawn, and contains eighty acres held from the Crown on a twenty-one years lease. There is a lode running east and west, 3ft. wide, consisting of quartz intermixed with ironstone, and two shafts following the underlie of the lode have been put down, one 343ft. and the other 70ft. The country rock is sandstone. The manager reports that sinking the deeper shaft has been suspended pending the erection of machinery to cope with the water, but at the bottom the lode had considerably improved, and was 4ft. thick. The amount spent on plant and construction to date is £469 15s. 5d., and wages and material £1,738 11s. 4d.; total, £2,148 6s. 9d. (March, 1890.)

**WICKHAM HILLS.**—Wm. Porteus, of Echunga, reports that about twelve years ago he assisted in sinking three shafts in the Wickham Hills, in search for a deep lead. One was put down 57ft.; a second, half a mile from the first, was sunk to 63ft. and bottomed on hard rock, dipping at an angle of 45°. Between these two a third shaft was sunk to the water level at 107ft., but not bottomed. Small quantities of gold were found in shallow sinking on the sides of the hills.

**WINNININNIE GOLD AND SILVER PROPRIETARY COMPANY.**—The property held by this company consists of twenty-four gold claims, fourteen miles from Mannahill

railway station, formerly known as the Railway and Shepherd's claims. The company has erected an Astra or Chilian mill. A good deal of costeeening and stoping has been done on an outcrop, and the result obtained was good, some of the reef yielding at the rate of 7ozs. to the ton. The reef has a very low angle, following the bed of the strata, 15° to 20°. (1889.)

**WEST WAUKARINGA.**—A claim situated three miles west of the Alma, upon which a considerable quantity of work has been done at various times. The Inspector of Mines says that the regularity of the reef formation, and its proved gold-bearing character, warrant testing the property at greater depth. (1889.)

**WESTWARD HO!**—From this mine, twelve miles north-west of Mannahill railway station, 1½ tons of ore was sent by the Government to be treated in Melbourne, and it gave a return of 2ozs. 6dwts. per ton. Later the mine became the property of Dr. Dixon, and a 20-head battery was worked. The reef is large, runs east and west, and underlies southward at a low angle. It is composed chiefly of iron oxides and gossan, and has every appearance of being permanent, and can be easily mined. Water level, 60ft. At a later period it was understood that the mine was sold to an English company. The Inspector of Mines reports that at the surface the outcrop is not more than 2ft., but widens in depth until at 300ft. the reef is 16ft. between walls. Thousands of tons have been dealt with, but the gold being fine has escaped into the tailings to the extent of fully 10dwts. to the ton. The sulphide ore has been proved to carry over 1½ozs. to the ton, a portion being free gold. From the concentrates 68ozs. 8dwts. and 21grs. gold, and 3ozs. 5dwts. 8grs. of silver per ton were obtained; and the tailings of the concentrates showed 16dwts. gold to the ton. A great deal of work has been done and prospects are encouraging. (1889.)

**WOMAN IN WHITE MINE.**—This is situated one and a half miles south of old Boolcoomatta Station, and 104 miles in a direct line north-east of Petersburg. The lode is very large, and consists of a quartzose, feldspathic, ferruginous veinstone, often stained with carbonate of copper. Its width is unknown, as no particular walls or junction with the bedrock have been observed. The workings consist of an excavation from 30ft. to 40ft wide, and from 20ft. to 30ft. deep. From this has come the stone for crushing. About 1,000 tons have been raised and treated, and the yield of gold per ton has varied from 8dwts. to 17dwts. In addition to the excavation, several prospecting holes have been sunk along the line of reef. The water level is about 70ft. from the surface. The gold is fine, and is disseminated through the veinstone. This, besides being stained with carbonate of copper, often carries copper pyrites. There is a 5-stamp battery and an engine on the ground. The bedrock consists of metamorphic, micaceous, and hornblendic gneissic schists, traversed by coarse granite dykes. In the vicinity of the workings there is a mass of diorite and micaceous diorite; but what relation this bears to the veinstone cannot be disclosed until more work has been done. A further exploration is to be desired, as nothing has been proved, and there is good reason to suppose that payable gold will be met with. (1887.)

**WONNA GOLD MINING SYNDICATE.**—Six claims situated at Wonna, about sixteen miles from Terowie, are held. (See GOLDEN POINT CLAIM.)

## THE WOODSIDE MINES.

**BIRD-IN-HAND MINE.**—Situation, section 5278, hundred of Onkaparinga; fifty-nine acres held on lease fifty years. It has three lodes bearing 10° east of north, with an underlay of 40° east. Their width varies from 1ft. to 8ft. The country rock consists of decomposed schist, with bands of sandstone, and the veinstone associated with the metallic minerals is quartz. Seven shafts have been sunk, one

to a depth of 341ft.; the drives and levels extend for about 4,000ft. in length. The water level was reached at 90ft. The quantity of stone raised equals 17,014 tons, and the smelted gold obtained is 6,079ozs., of the value of £18,642 15s. Stone taken from the stopes between the 210ft. and 275ft. level gave 1,544ozs. of smelted gold from 3,183 tons of quartz. The gold occurs in shoots apparently perpendicular to the vein. This mine was being worked in 1887, and machinery consisting of a 50-inch cylinder beam-engine, and 18-inch pumps, had recently been erected. The Inspector of Mines visited the property last year, and reported that the mine has produced since starting 8,860ozs. of gold in the treatment of 21,000 tons of lode formation, that from the bottom level producing on an average 13dwts. per ton. The mine is yet comparatively speaking shallow, and there is encouragement in the fact that the length of payable ground increases with the depth attained. There are three parallel reefs, and only one has been worked to any extent; and there is not the slightest doubt of permanency; they should be worked profitably down to a depth of 2,000ft. The Victoria shaft should be continued down to 600ft. before the reef is touched. Mr. Scarfe, the secretary, has supplied the following information:—The Victoria vertical shaft is 350ft., main shaft vertical 410ft., and others of shallower depth, part on the underlay. The length of drives is about 5,500ft. The gold occurs in shoots, and 21,487 tons of material treated gave 9,017ozs. smelted gold. The value of the machinery on the mine is estimated to be £17,271, and of the gold raised £26,408 0s. 7d. Work partially stopped pending reconstruction of the company.

**BIRD-IN-HAND EXTENDED MINE** is two and a half miles east of Woodside, and is situated on section No. 5250, hundred of Onkaparinga. It was opened some years since, but owing to want of funds the work has been discontinued. Gold was frequently seen in the stone, but none of it was crushed. There is one lode with a north and south bearing and underlay; it is 20ft. wide, and is a continuation of the reef in the Bird-in-Hand property. The ore is ferruginous quartz, which on assay yielded at the rate of 17dwts. to 1oz. of gold per ton. It occurs in a large broken reef, consolidating under foot; about 50 tons of ore were raised. The workings consist of one shaft sunk to a depth of 100ft., and drives extending 250ft. This mine is not being worked. (1887.)

**BRIND MINE** is on the west side of section No. 5256, hundred of Onkaparinga, and adjoins the Bird-in-Hand Mine. The reef at the south end is 6ft. thick, and consists of white quartz, enclosing pyrites and some carbonate of lead in cavities. It strikes a little west of north and dips E. 25° N. at an angle of 57°. A shaft has been sunk to a depth of 38ft. A portion of the surface was sluiced to a depth of 3ft., and 50ozs. of gold were obtained. This included nuggets of the following weights:—One of 16ozs., and others of 9ozs., 7ozs., 5ozs., and 4ozs. (1887.)

**EUREKA MINE** is on section No. 5259, hundred of Onkaparinga. It contains one lode bearing 24° west of north and underlying 42° east. It is 6ft. wide and carries gold in quartz. The country rock consists of sandy schist, with bands of sandstone and dioritic slate. Four shafts have been sunk, one of which is sunk on the underlay of the reef, and is 229ft. deep. The drives and levels extend a distance of 500ft. The water level is reached at 47ft. The ore occurs in shoots dipping slightly north. The stone containing free gold has been treated by the battery, and yielded an average of 12dwts. of gold per ton; but the reef, as it continues in depth, has developed galena, blende, iron and copper pyrites. These yield on assay from 2ozs. to 3ozs. of gold, and from 5ozs. to 10ozs. of silver to the ton. Owing to the mine not having been regularly worked it is impossible to give the quantity or value of the stone raised in past times. (1887.)

**FOUNTAIN HEAD MINE** is on section No. 5241, hundred of Onkaparinga. A vertical shaft has been sunk to a depth of 92ft., and at 74ft. a reef was struck.

This, it is reported, gave rich prospects of gold. An influx of water, however, stopped the work. An underlay shaft has been sunk on the same reef to a depth of 27ft., and gold was found in the stone; two other shafts were sunk to depths of 85ft. and 42ft. respectively. The quartz is cellular, and contains iron pyrites; gold is visible on crushing, and also in the quartz. The width of the reef is about 2ft. 6in. An assay of a sample of the quartz, in which gold was not visible, yielded gold at the rate of 1oz. 6dwts. 8grs. per ton. (1883.)

**MINT MINE** is on part section No. 5259, hundred of Onkaparinga. It contains one lode bearing N.W., and having an underlay of one in two to the N.E. The width varies from 1ft. to 3ft. The stone is auriferous quartz, and occurs in patches, but a little fine gold is distributed through the mass of the ore. About thirty tons have been raised, and the average yield of gold to the ton is calculated to be about 4dwts. This is exclusive of specimens obtained. The workings consist of two underlay shafts, the deepest of which is about 60ft., and a drive 20ft. in length. The water level is at the depth of 55ft. Very rich specimens were found in this mine at a depth of 40ft. on the footwall of the reef. They were lying on a ledge formed by the rock. Some of them contained as much gold as quartz.

**MOUNT CHARLES**, near Woodside.—Some shallow excavations have been made in quartz reefs in this neighborhood. So far, however, as can be ascertained no quartz was crushed or gold obtained.

**NEST-EGG MINE** is on section 5297, hundred of Onkaparinga. A shaft has been sunk to a depth of 52ft. on a quartz vein about 4ft. wide. A vertical shaft, 84ft., in the direction of the underlay, has also been sunk to 50ft., and is connected with the first shaft by a drive. This passed through two other quartz veins. A main shaft has been sunk 120ft. to strike the reef on the underlay. Owing to the quantity of water met with in sinking, operations had to be suspended. The underlay of the Fountain Head reef will probably be met with in sinking. (1884.)

**NEW ERA GOLD MINE** is situated on part sections 5263 and 5267, hundred of Onkaparinga, about two and a half miles from Woodside. There is one main reef bearing north and south, and two spurs bearing to the north-east. The underlay is 1ft. in 3ft. to the east, and the width varies from 6ft. to 20ft. The stone consists of auriferous quartz, highly ferruginous, and has yielded 4dwts. to 8ozs. of gold to the ton. About 14,000 tons of stone have been raised and crushed, and have yielded gold to the value of £18,500. The veinstone associated with the metallic minerals is ferruginous silica, and the country rock consists of pipeclay, mica schist, sandstones, and diorite. The gold occurs in patches, but fine gold is distributed through the whole width of the stone, and in some places is found in the surrounding country. The best shoot is where the spur reef joins the main north and south reef, and dips to the north about 5ft. in 100ft. One vertical and six underlay shafts have been sunk, the deepest being 120ft. There are two drives—one of 900ft. at the 112ft. level, and one of 100ft. at the 50ft. level. The water level is reached at 50ft. (1887.) Subsequently two crushings of stone yielded 428ozs. 14dwts. 12grs. of gold. The following particulars have been furnished by the manager:—There is one lode, striking nearly north and south, averaging about 10ft. thick. No. 1 shaft is 180ft. deep, and No. 2 is down 90ft., both vertical, and there is a tunnel driven 700ft. from a creek making the 112ft. level. The matrix of the ore is a much-jointed ferruginous silica, and the country sandy slate and diorite. The ore carried is an iron oxide, with occasional patches of oxide and carbonate of bismuth, in which the gold is richer. When this mine was first opened, 30 tons of the stone gave 8½ozs. to the ton, and 160 tons 3½ozs. to the ton. Then the whole width of stone, sometimes 30ft. across, was put through for an average yield of 10dwts. The lode was stopped to the 112ft. level, when the water became very heavy; and after sinking to 180ft., work had to be stopped because of inadequate pumping appliances.



The lode is a true fissure vein of great width, and has been proved to be auriferous for 700ft.

**NEW VENTURE** is on section 5260. Some work was done in driving tunnels, but no gold was found.

**PARLIAMENTARY CLAIM** is in sections 5050 and 5051. A number of shallow openings have been made. Near the reef there was a run of surface gold ten yards wide, going half a grain to the dish.

**RIDGE GOLD MINE** is situated on part section 5249, hundred of Onkaparinga, south of the Bird-in-Hand Mine. There are three lodes bearing  $10^{\circ}$  east of north, with an underlay of  $40^{\circ}$  east, varying in width from 1ft. to 16ft. The country rock consists of decomposed schist and sandstone, and the veinstone associated with the metallic minerals is quartz. Five shafts have been sunk, the deepest being 140ft. The main shaft was sunk to a depth of 120ft. vertical, but had to be abandoned in consequence of quicksand being met with. The water level was reached at 45ft.; drives and levels have been made to a total length of about 1,700ft. Two thousand five hundred tons of stone have been raised, and have yielded 380ozs. of smelted gold, to the value of over £1,213. The crushings, however, at this mine were trial crushings and intermittent. The gold occurs in shots. The mine is not working. (1887.) The Inspector of Mines (1889) says that, judging from the nature of the stone and character of the battery, whilst 4dwt. of gold per ton has been saved, double that quantity has been lost in the tailings heap. There are thousands of tons of auriferous quartz in sight. If anything like 90 per cent. of the actual gold in the stone could be secured the greater portion of the reef would pay for stoping, and a large number of men should be profitably employed. Mr. Scarfe, the secretary, states that this property has the Bird-in-Hand, Brind, and Eureka reefs, and the widths vary from 1ft. to 16ft. The deepest shaft is 210ft., and 1,700ft. represent the total extent of drives. Pyrites exist at lowest level, and 375ozs. of smelted gold was obtained from 2,116 tons of crushed quartz.

**TWO-IN-THE-BUSH MINE** is on part section 5261, hundred of Onkaparinga. There is one lode, bearing  $10^{\circ}$  east of north, with an underlay of  $40^{\circ}$  east. The width varies from  $1\frac{1}{2}$ ft. to 18ft. The country rock consists of decomposed schist and sandstone, and quartz is the veinstone associated with the metallic minerals. Three shafts have been sunk, the deepest of which has 265ft. vertical. Drives and levels measuring about 1,000ft. in all have been made. The water level was reached at 100ft.; 2,198 tons of stone have been raised, and 386ozs. of smelted gold, valued at over £1,130, have been obtained. The crushings on this mine were trial ones, and intermittent. The principal work done was the sinking of the main shaft, and the endeavor to open up the ground at the deepest possible point that could be drained by the pumps. Mr. Scarfe, the secretary, states that the drainage of the mine being affected by the pumping operations at the Bird-in-Hand Mine, further work here has been deferred pending the successful development of that enterprise.

**YUDNAMUTANA GOLD DISCOVERY.**—Near the Yudnamutana Mine the gravel and detritus has been worked to a slight extent for gold. Gold is also found here and there in the creeks and watercourses; but the work done simply consists of some very shallow holes and surfacing. But the last-named operation is difficult, owing to the creek beds and flats being filled with boulders. Prospecting might be carried on with advantage lower down the creeks, where they become less steep.

This discovery is believed to have been made by a Government prospecting party about the year 1874.

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**GOLD BOUGHT BY THE ENGLISH, SCOTTISH, AND AUSTRALIAN CHARTERED BANK.**

The following return of gold bought by the English, Scottish, and Australian Chartered Bank, from November 22nd, 1886, to April 15th, 1887, and the table of prices, have been supplied through the courtesy of the manager (Mr. Cowle):—

Locality.	Ozs.	dwt.	grs.
Teetulpa .....	10,571	16	0
New Kra .....	474	4	0
Barossa .....	30	2	12
Echunga .....	9	5	18
River Torrens .....	8	4	18
Blackwood Gully.....	5	7	0
Peake .....	29	12	18
Sundries from diggings near Adelaide .....	11	15	2
	<u>11,140</u>	<u>7</u>	<u>30</u>

**TABLE OF PRICES GIVEN BY THE ENGLISH, SCOTTISH, AND AUSTRALIAN CHARTERED BANK FOR ALLUVIAL GOLD.**

	£	s.	d.	
Peake Diggings .....	3	18	6	per oz.
Teetulpa Diggings .....	3	17	0	"
Barossa Diggings .....	3	16	0	"
Echunga Diggings .....	3	14	0	"
Gumeracha Diggings .....	3	12	6	"
Blackwood Diggings .....	3	12	6	"
Morialta Diggings .....	3	12	6	"
Houghton (Torrens river) Diggings .....	3	12	6	"
Forest Range Diggings .....	3	15	0	"

## MANGANESE.

ELLEN MINE, twelve miles S.E. of Gordon.

ETNA MINE, six and a half miles N.E. of Gordon.

GORDON MINE, eight and a half miles N.E. of Gordon.

PROUT'S MINE is near Scott's Mine, and now called the South Australian Manganese Mine. (See below.)

SCOTT'S MINE is situated between Orroroo and Hammond, on the railway.

WATT'S SUGAR LOAF, near, and about five miles from Gordon (Great Northern railway).—A large deposit of manganese has been worked for some time. Blocks of ten to twelve tons of ore were found on the surface, and a considerable quantity was shipped to England.

Manganese and iron ores are common in many parts of the colony. The ore often contains cobalt, but not in sufficient quantity to render its working payable.

WILLOWIE FOREST RESERVE.—In 1886 a deposit of manganese was found in the Willowie Forest Reserve, about four miles north of Melrose. An analysis made by Mr. G. Goyder, jun., showed that the manganese contained cobalt varying in percentage from 1.7 to 2.31. No work has been done to test the lode.

SOUTH AUSTRALIAN MANGANESE MINE.—Locality, Boolcunda Creek, near Willochra; area, eighty acres of Crown lands, leased for ninety-nine years. The company commenced operations in 1882-3, and has done a considerable amount of work, winning a fair output. Mr. W. Dunn, the secretary of the company, states that there are four parallel lodes having a westerly strike, and one averaging 9ft. in width, and the others 2ft. to 5ft. There are five vertical shafts (deepest 75ft.), and a tunnel 140ft. One drive has been put in 80ft., and the other over 200ft. The lodes are composed of pyrolusite, manganite, and psilomelane, and the yield is now from 3,000 to 4,000 tons per annum. Ore has been sent away continuously during the last three or four years. (1890.)

The Government Geologist, reporting generally upon mineral claims in the neighborhood of Orroroo and Carrieton, says that manganese ores are frequent in outcrops or "blows," some of them being very rich. These outcrops, as a rule, are not of a permanent character, although some of them will yield a considerable quantity of ore. The chief places where these occur are at McGee's Springs, Eurelia, Kinnane's, and Byerlee's, near Carrieton. Captain Dillon says that, about sixteen miles north-east of Carrieton, there is a manganese mine where there is an immense lode, enclosed in clearly-defined walls.

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## IRON.

**GUM CREEK, near the Burra.**—On section 427 there is a large excavation, in soft argillaceous slaty sandstone, from whence iron ore and manganese have been taken out of a blow. (1883-4.)

**MOUNT JAGGED IRON MINE** is situated on the summit of the mount, nine miles S.E. of Willunga and eleven miles north of Victor Harbor. A small company was formed in 1873, and smelting works, consisting of a furnace 30ft. high, engine and blowing cylinder, and the necessary sheds, were erected, at a cost of about £2,500. These were placed five miles from Mount Jagged, upon one of the sources of the River Hindmarsh. Water and fuel were abundant, and also crystalline limestone. This was in huge boulders, and of so hard a character that lithofracteur had to be used in working it. The principal supply of ore was from the summit of Mount Jagged, 500ft. above the works. The mount is capped by a mass of black oxide, yielding 50 per cent. of pure iron, and unmixed with any matrix. A vertical shaft was sunk to a depth of 70ft., and the ore held good all the way down. Charcoal for the furnace was supplied at £2 per ton, and the ore at 12s. per ton. About 50 tons of iron were smelted, but owing to the ignorance of the furnace-keeper the furnace was frequently allowed to get cold, and then had to be cut out. This so damaged it that at last it became unsafe to work, and there being no funds in hand to build a fresh furnace, the company was wound up. The amount of capital subscribed was far too small for the proper working of the mine, being not more than £3,000. The cost of making the iron was reckoned at about £2 10s. per ton. Mr. C. L. Dubois has furnished the foregoing account. (1887.)

**SCRUBBER'S CAMP, near the Burra Mine,** has been worked as a copper mine, but a lode of iron ore runs through the property.

Numerous iron blows have recently been prospected for flux suitable for use in the silver smelting now carried on so extensively, and a considerable trade in iron ore is now being prosecuted, the neighborhood of Kapunda furnishing a large quota.

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**FLINDERS RANGE UMBER, OXIDES, AND OCHRE MINE.**—This is situated twelve miles east of Blinman, and the property contains 160 acres, held under mineral licence, on which Captain Doble reports that there are six lodes, varying in widths from 4ft. 6in. to 50ft., the last mentioned being a very large iron lode embedded in yellow ochre and pipeclay. He judges from the appearance of the deposits that they are likely to yield silver when fairly prospected. (1890.)

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## BROWN COAL AND LIGNITE.

So far as is at present known there are no coal measures in this province of the age of those that are worked in New South Wales. There is a great gap in the series of formations, namely, from the lower palæozoic (Cambrian, Silurian, and Devonian) to the cretaceous; none of the intervening rocks in that series having been observed outcropping upon the surface. Although this is unfortunately the case, still it is possible that beneath the thick deposits of tertiary and cretaceous age, which overlie the greater part of the older rocks, there may exist any of the older formations which occur in other parts of Australia. The only means by which this point can be determined is by boring, and as this is an expensive and tedious operation, the experiment would be too costly and the results too uncertain to warrant anyone employing that method on the mere chance of success.

### KUNTHA HILL, LEIGH'S CREEK, TEATREE GULLY, RHINE VILLA, WIRABARA, &c.

From time to time announcements have been made of supposed discoveries of coal, which in most instances have proved to be, at best, merely recent tertiary lignites, of no value for fuel. In two cases, however, namely, at Kuntha Hill, 110 miles north of Hergott, and at Leigh's Creek, on the Great Northern railway line, north of Quorn, a better class of brown coal and lignite has been found.

LEIGH'S CREEK was visited by the Government Geologist in February, 1889, in consequence of a reputed discovery of carbonaceous shale at the railway tank, near to the Leigh's Creek railway station and at Glen's Gums. He expressed his opinion that the shales were probably of cretaceous age, that there were good grounds for assuming the presence of coal in them, and that it was desirable to test the question of the presence or absence of coal in workable quantities, by boring or sinking shafts. A private company was then organised, and they sank a shaft 70ft., at which depth the great influx of water prevented further sinking. Recently this company has received assistance from the Government, who have provided a diamond drill and undertaken the payment of two-thirds of the cost of boring. The bore was started at Glen's Gums on February 7th, 1890, and the following sections were passed through in the first bore, there being no samples forwarded illustrative of the first 15ft. :—

15ft. to 100ft. . .	Blue shale.
100ft. to 125ft. . .	Blue shale.
125ft. to 135ft. . .	Carbonaceous shale, interstratified with thin layers of lignite or brown coal.
135ft. to 137ft. . .	Seam of lignite 2ft. thick (*see analysis).
137ft. to 142ft. . .	Carbonaceous shale.
142ft. to 152ft. . .	Blue shale.
152ft. to 158ft. . .	Shale, and carbonaceous shale, with layers of lignite.
158ft. to 164ft. . .	Blue shale.
164ft. to 170ft. . .	Blue or white shale.
170ft. . .	Blue rock, kaolinized gritty slate, &c., with much mundic, resting on inclined beds of calcareous clay slates, quartzite, and limestone of primary age.

In December last, the Government Geologist inspected the locality of a supposed coal discovery near WIRABARA, hundred of Appila. He had to report that he saw no coal at the site of the assumed deposit, and that the rock formation there was of too great an age geologically to warrant any search for the mineral in that district.

\* An analysis of four samples of this seam have been made by Mr. George Goyder, jun., with the following average results :—

Moisture .....	18.55 per cent.
Hydro-carbon .....	83.88 "
Coke .....	38.48 "
Ash .....	8.69 "
	<hr/>
	99.90 "

This analysis compares favorably with brown coal or lignite found in America of the same age,

In August, 1888, because of an alleged discovery of coal, "similar in character and equal in quality to that obtained at Newcastle, New South Wales," the Government Geologist paid a visit of inspection to a place near RHINE VILLA, on the Murray Flats, hundred of Angas. The coal was said to have been found on the surface, and also in a bed of clay, in which a shaft had been sunk to the depth of 110ft. He came to the conclusion that the finding of these fragments of good coal in the position he saw in no way indicated the existence of coal seams beneath these tertiary clay deposits, and that the adjoining bed rocks were, geologically speaking, too old to contain coal; that the coal found was not *in situ*; and that the only coal likely to be met with in sinking was lignite. A contrary opinion having been expressed by Mr. Howchin, F.G.S., who subsequently inspected the locality for the discoverers, a company was formed, and boring was commenced on the site of the discovery, and operations are still being carried on, which, so far as can be ascertained, have merely proved the thickness of the tertiary beds, and discovered no coal seams of any kind. Boring is still in progress in the neighborhood. Mr. Howchin, in reply to an inquiry, states that since 1888, the Wyndham Company have sunk two bores on the property without success. In each case a very thick bed of carbonaceous mud and lignitized wood was penetrated, but there was nothing in either section that was at all like the mineralised shale found at surface, excepting a few small fragments found near the base of the tertiaries in the first bore.

KUNTHA HILL is situated on the Birdsville track, 110 miles north of Hergott Springs. The Government Geologist inspected this place in the earlier part of 1889, and obtained samples from a shaft which had been sunk. He arrived at the opinion that the "coal" had been deposited in lake or swamp basins, which originally had received the waters of the Diamantina and Cooper's Creek, and that there was a highly encouraging prospect of obtaining brown coal or lignite by boring or sinking. But he pointed out that the remoteness of the locality from a railway, and other natural disadvantages, such as lack of timber, water, &c., would seriously affect the work of prospecting, and would make the sinking of the numerous shafts necessary for exploration of the supposed coalfield very expensive. He observed that the clay and shale sunk through contained in abundance fragments of fossil leaves and carbonaceous matter generally, which belonged to the fresh water beds of the lower tertiary or upper cretaceous rocks, and overlaid marine cretaceous formations. The following information has been furnished by Mr. Niehuus, manager of the company formed to prospect the property. The area held is 10,000 acres, under permit from the Hon. the Commissioner of Crown Lands, and in the prosecution of the search for the coal seams three shafts and two bores have been put down vertically, the depths of the former being respectively 70ft., 84ft., and 150ft.; and of the bores, 298ft. and 112ft., and three seams of coal have been passed through in the shafts of the thickness severally of 2ft. 6in., 2ft., and 5in. A direct, as well as comparative analysis, is appended:—

Wyoming brown coal (similar formation in western North America)—

Water.....	10.0
Volatile matter .....	38.0
Fixed carbon.....	49.0
Ash.....	5.0

Kuntha Hill coal, two samples, analysed by Mr. Geo. Goyder, jun.—

	First Sample.	Second Sample.
Water .....	11.68	11.0
Volatile matter .....	36.63	36.77
Fixed carbon .....	42.70	43.39
Ash.....	8.99	7.84

**TEATREE GULLY.**—In this locality, which is twelve miles from Adelaide, a good deal of attention was given for a time to another supposed discovery of coal or lignite, and it led to an examination by the Government Geologist in September, 1888. In this neighborhood there is a bed of white clay, which is mined at the depth of 100ft. for use in the manufacture of pottery, for which it is excellently adapted; and in this clay a little woody lignite and some carbonaceous matter occur. He reported according to the facts, and expressed the opinion that the lignite did not indicate the presence of true coal, and that there was no chance of discovery of a coal seam by boring. Despite this expression of opinion, a company was formed and a drop-drill procured from the Government. A bore was put down, it is believed, to a depth of 249ft., when it reached solid limestone or calcareous slate. No record appears to have been kept of the strata passed through, but the first 100ft. would doubtless consist of tertiary sands and clays, underneath which boulders or gravel would be met with resting on the bed rock.

**PIDINGA LIGNITE.**—At Pidinga, eighty-six miles north of Fowler's Bay, there is a bed of lignite outcropping on the shores of a salt lake. By shallow sinkings of a foot or two the deposit was found to extend for about half a mile, or all across the lake. By boring, the bed of lignite was ascertained to be 30ft. thick, and fossil resin was found to occur in it. The quality of the lignite is not good enough to allow of its being used as fuel.

Lignite has also been found in other localities, as, for example, Coffin's Bay, where it was proved to be in thin seams and of poor quality—unfit for fuel.

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#### COORONGITE, OR AUSTRALIAN CAOUTCHOUC.

This is an indiarubber-like material, which was discovered many years ago near Salt Creek, which empties itself into the Coorong, a saltwater inlet extending from the Murray mouth for about ninety miles parallel to and a short distance from the coast. It was first observed on the surface in little hollows in the sand, and resembled patches of dried leather; it generally occurred in the swamps. The theory formed was that this substance had resulted from the overflow of petroleum or rock-oil, and boring operations have since been conducted at various periods, with the view of tapping the oil-bearing strata from which this peculiar substance was supposed to have exuded. The greatest depth of bore attained was somewhere about 500ft., and so far as is known the beds passed through were tertiary sands, clays, and limestones, resting on blue clay slate. It is understood that a company has recently imported boring machinery from America, with a view of renewing the search for rock-oil. There is a wide difference of opinion as to the origin of the substance which has led to these efforts. Some scientific authorities in England and America ascribe to it a vegetable origin, and regard it as a gum exuding from a plant or a lichen. Other persons assign to it a subterranean origin, but this view is not at present supported by ascertained facts.

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## MINING IN THE NORTHERN TERRITORY.

The large area of country attached to South Australia by Letters Patent under the Great Seal in 1863 contains 423,620 square miles, or 335,116,800 acres, and has been proved to be rich in minerals.

The Rev. J. E. Tennison Woods, in October, 1886, furnished a very exhaustive report (Parliamentary Paper No. 122) describing its physical features, geology, and minerals, in respect to which latter he said that the country is rich in gold, and the reefs would pay well to work, were not wages and cartage so enormously high. Not twenty-five per cent. of the auriferous reefs have been fairly tested, and not one of the mines hitherto worked or abandoned has been exhausted of gold. Some of the crushings of top stone have yielded exceedingly rich returns, thus at the Extended Union in 1877 forty tons of quartz produced 740ozs. of gold. In alluvial workings the sinking is shallow, and the gravel is scarcely waterworn. The fine gold appears to be inexhaustible. All the silver lodes in the Northern Territory are of silver-lead; and silver is associated with gold in one or two mines, and with copper. There are few ores from which a bead of silver cannot be obtained by means of an ordinary blowpipe; the silver-lead veins are found on the edge of the slate, and near the junction with the granite. Tin will eventually be one of the great sources of mineral riches, as it occurs in the comparatively rare form of reef tin. No stream tin (properly speaking) has been observed, but vein tin is abundant and rich, and the Northern Territory may be emphatically pronounced to be a tin country. The copper ores of the Daly River copper mines are of singular richness and also apparently abundant; and this mineral is found also in other places. Nickel, iron, manganese, graphite, bismuth, and gem-stones, are said to have been also found in various localities.

The "Northern Territory Times Almanac and Directory" for 1890 affords the following information:—During 1886-9 considerable progress has been made in mining matters, and many new discoveries of silver, tin, and copper-bearing lodes have been reported. The Eureka Gold Mine, the Eveleen, Flora Bell, and Coronet Hill Silver Mines, and the Mount Tolmer Tin Mine, are amongst the most important recent discoveries, and all of them give promise of a good output of ore and metal at no distant date. At present prospecting to a depth is causing generally the suspension of smelting operations. In gold mining very little advance has been made; but the quartz-mining industry seems to languish for want of capital and enterprise and adequate machinery, though there are millions of tons of stone that would yield 8dwts. to 10dwts. per ton. In spite of the somewhat depressed state of the Territory the mineral exports for 1889 exceeded those of 1888 by £13,156 in value, although smelting operations had stopped.

As to the earlier discoveries of auriferous localities in this part of Australia, it may be mentioned that the Surveyor-General, Mr. Goyder, in reporting upon the survey of the Territory, stated that gold had been discovered at Tumbling Waters, on the Blackmore; section 618, west of the Blackmore; at and above the bar on the Charlotte, leading into Bynoe Harbor; on the Finnis, near section 2,130; at Rocky Waterholes, section 2,193; and in the River Darwin. Mr. Litchfield made the discovery in the Finnis, and subsequently over ½oz. was washed out by the party.

**AN ALLUVIAL FIELD** has been discovered near Mount Gates, a few miles down the Katharine River, and a few Europeans and some fifty Chinese diggers are reported to be making fair wages there.—("N.T. Almanac and Directory.")

**BERGIN'S CREEK.**—Locality, about six miles south of the Howley. Alluvial and reefs claims in the hands of the Chinese. The country has a very promising appearance, and the indications are all of the best auriferous character.—(Woods, 1886.)



**BRIDGE CREEK.**—Alluvial diggings on open flats. One small quartz leader is worked (1886), the stone being crushed by hand. The gold is so fine and scaly that it floats away in the panning. Twenty white miners and many Chinese are there.—(Woods, 1886.)

**BROCK'S CREEK.**—The description above applies also to this property.—(*Ibid.*)

**CEMENT GULLY.**—A shallow flat close to Grove Hill; sinking, 10ft. to 12ft. Much gold obtained, no doubt derived from the ranges on each side, in which, however, there are nothing more than a few unproductive leaders.—(*Ibid.*)

**CORONET HILL SILVER CLAIMS.**—These are situated about fifteen miles south-east of the Eveleen, on a branch of the Mary River. There are three parallel lodes striking north-west and south-east, and a shaft has been sunk on the main lode (which averages 12ft. wide) to the depth of 85ft. Assays of samples from the shaft taken from surface to depth named average 40ozs. silver to the ton. (Chief Warden Nash.)

**CRUICKSHANK & BARRETT'S TIN CLAIM.**—Near Mount Shoobridge. A quartz outcrop on a low ridge, standing out like a wall, thickly veined with black tin ore. A beautiful mineralogical display. (Woods, 1886.)

**CLIFTON GOLD MINE.**—Near to Springhill Mine. Worked for a time, but did not pay the expensive charges.

**COPPERFIELD COPPER MINE.**—Five miles from the terminus of the Palmerston and Pine Creek railway. Discovered in 1872; abandoned in 1880; again acquired, and in 1887 bought by Mr. C. G. Millar. A strong lode of high-grade grey ore, to open which two shafts have been sunk; one down 50ft. carries a 4ft. lode; the other at 20ft. in the lode does not touch either wall. During the past season 500 tons of 30 to 40 per cent. ore have been raised and shipped.—("N.T. Almanac and Directory.")

**DALY RIVER COPPER MINE.**—This property has now been purchased by a Port Darwin syndicate, and is yielding satisfactory returns. It has yielded over 2,000 tons of 28 per cent. ore, all mined from one shaft less than 100ft. deep and having three levels. (*Ibid.*)

**ELEANOR GOLD CLAIM.**—The Rev. Mr. Woods mentions that Jansen, in five years, got 9,000ozs. of gold from this claim.

**EUREKA GOLD MINE.**—Situated three miles south-east of the Eveleen Silver Mine, and northern end of Houschildt's Rush. The returns have, from the commencement, paid working expenses. The property is large, and there are thousands of tons of payable stuff available for an improved crushing plant. One shaft is down 115ft., and the drives show a well-defined reef 3ft. wide, which gives machine returns of a little under an ounce of gold to the ton, whilst assay of tailings shows a considerable percentage in the concentrated pyrites. (Woods, 1886.)

Mr. Chapman, the secretary and legal manager, gives the following particulars:—The lease comprises sixteen acres, in which there are two lodes, striking north-west and south-east, with a width of from 2in. or 3in. to 15ft.—average 3ft. There are six shafts, 80, 126, 80, 67, 25, and 25ft., respectively; length of drives, 500ft. The reefs above water-level show ferruginous quartz, and below, almost solid pyrites, with slate walls. Four thousand six hundred and seventeen tons of stone crushed have yielded 2,890ozs. of gold, value £7,212. This property adjoins the Eureka South, Maybell, and Eureka West Mines.

**EUREKA SOUTH.**—No information.

EUREKA WEST.—No information.

EVELEEN SILVER MINE.—Situated near the south-eastern extremity of the metalliferous ranges, four miles west of the upper reaches of the River Mary, on the junction of the metalliferous slates with the blue granites. The outcrop, called Pinnacle Hill, shows a number of lodes, one many feet wide, containing brilliant shoots of galena. There are an immense number and variety of minerals in the veins and pockets, forming a sight of rare beauty. It is said, that the percentage of silver in the lead is very high; the copper ores are poor and light. (Woods, 1886.)

Mr. A. A. Gallagher, the secretary and legal manager, states that the company hold 160 acres under mineral lease, and have seven lodes, which strike north-west and south-east, with a width ranging up to 13ft. Six vertical shafts have been put down, of the respective depths of 35ft., 65ft., 110ft., 38ft., 18ft., and 20ft., and there are 800ft. of drives. Above water-level, the lode consists of gossan, and below, of solid galena, with dolomite walls. Two thousand two hundred and twenty-four tons of ore yielded 601 tons of lead, and 89,391ozs. of silver.

EXTENDED UNION GOLD MINES.—About three miles south-east of Springhill. A great mass of stone has been taken out, and the cap of the lode looks like an empty quarry. It was formerly a tangled mass of leaders going in every direction, giving as much as 80ozs. of gold to the ton. Subsequently, the reef growing poorer, the mine was mismanaged, and is now (1886) let on tribute to Chinamen. With good management the mine would yield large returns. (Woods, 1886.)

FLORA BELL PROPRIETARY SILVER MINING COMPANY.—The property consists of sixty-eight acres of mineral land, within two miles of the Palmerston and Pine Creek Railway. No further information.

FOUNTAIN HEAD GOLD CLAIM.—There was a large quantity of gold found in the alluvial, all worked by Chinese, of whom there were as many as 300 at one time. It was long deserted, but according to Mr. V. L. Solomon, has resumed working, and a 10-head battery, with the latest saving appliances, is now treating the stone.

GRIERSON'S GULLY GOLD CLAIM.—A broad flat, worked in shallow sinkings for alluvial gold. The gravel is small, in angular fragments, and consists of blackish quartz and schist. (Woods, 1886.)

HALE RIVER REEFS.—The principal gold reefs hitherto discovered are south of the Hale, between and in the vicinity of Running Water, Paddy's Hole, and the Government Well. At the time the Government Geologist visited the place (Nov., 1888), there were very few men on the field, as owing to want of water they were unable to work at the reefs. At Paddy's Hole a shaft was being sunk on quartz veins, with gossan and iron ore patches; fine gold was visible in the stone, and from crushings good prospects of this gold were obtained. The rocks here are argillaceous, gneissic, micaceous sandstone, and granite, with quartz reefs. The groups of claims on the Hale were some eighteen or twenty in number. In all, or nearly all, fine gold could be seen on breaking the stone, and on crushing and washing the quartz similar gold was always visible. The reefs are composed of quartz containing gossan, iron oxide and pyrites and a little copper. The quartz is generally cavernous, and it is in these cavities that the fine gold is most frequently seen; in some cases quite freely. As a rule the veins are small, and the exposure of reef along the surface short. In some claims there are several parallel reefs. Some of the richest are only a few inches wide on the surface. So little work has been done that it is very difficult to say with any degree of confidence what the average return of gold per ton is likely to be. The best of the reefs may be expected to yield in bulk from 1oz. to 3oz. to the ton. There is no reason to expect phenomenal yields, as the gold is very finely disseminated. No doubt, when machinery has been erected, and these

reefs come to be worked, richer stone will be met with, and some of the larger reefs, which at present have not been prospected, will be found to be gold-bearing. The bearing of these reefs is north-north-east, north and south, &c., and they vary in width from a few inches to 2ft. The country rock is gneiss, micaceous slate, and sandstone, diorite, epidosite, syenite, &c. The ranges where the reefs occur are traversed by numerous gullies and sandy creeks, which are likely to contain alluvial gold. Mr. Benstead, of Alice Springs, informs us that there are now three machines on the field: a Huntington mill, and two three-head stampers; but only one crushing has yet been had, when a parcel of twenty tons yielded 17ozs. and some pennyweights. There is a shaft on the Junction reef which has been sunk to a depth of 50ft., and coarse gold is carried all the depth. The Wheal Fortune has struck a reef at a depth of 90ft., which is 2ft. wide, and shows gold. There is a Government well 40ft. deep, which gives all the water supply available.

**HALE RIVER SILVER LEAD.**—Whilst examining the Hale River Reefs the Government Geologist was shown several specimens of silver lead, which were said to have been found in the neighborhood of the reefs. An assay of two samples, by Mr. Goyder, jun., returned—silver 44oz. 12dwt., and 12oz. 15dwts., and lead 48 per cent. and 13 per cent. respectively. The country rocks are similar to those of the Barrier Ranges and the north-east, and are likely to contain both silver and copper-bearing lodes.

**HOUSCHILD'T'S RUSH.**—This is an alluvial and reef goldfield, about four miles south of the Eveleen, and said to extend seven miles. The sinking is very shallow, in a soft ferruginous slate. Chinese were working in a band of decomposed limonite or ironstone. It must be very rich, for gold was visible in all the matrix, which is a very red gravel. There must be many other reefs. (Woods, 1886.)

**ISABEL GOLD MINE.**—Situated south of the Extended Union, and possessing a fine reef of stone nowhere less than 6ft. wide, and in some places much more. The owners got from 209 tons of quartz 268oz. of gold. Influx of water stopped working. (*Ibid.*)

**JOHN BULL GOLD MINE.**—An alluvial and reef claim that was rendered unworkable by flooding. Situated about six miles south of the Howley. Indications very excellent. (*Ibid.*)

**MAUDE CREEK REEFS.**—Situated about fifteen miles from the Katherine. It is believed that the quartz contains large quantities of fine gold in conjunction with iron and pyrites, which cannot be extracted by any but the latest improved machinery.—("N.T. Almanac and Directory.")

**McKINLAY TIN MINE.**—Locality, a mile and a half south by west of Burrundie. The bed-rock crops out in irregular angular fragments, slaty in structure, and the rock is crystalline, showing mica in minute crystals, and quartz in a very hard felspathic paste.

**McKINLAY AND MOUNT WELLS TIN MINING ASSOCIATION** holds five (5) blocks, containing about 3,200 acres. A few shafts have been sunk and clearings made on the cap of the lodes. The main lode shows exceedingly well. The tin is in fine crystals in quartz, or disseminated in chlorite of massive character, and little or no iron. It is stated that picked ore sent to England produced over 50 per cent. of tin of the finest quality. On the ridges of the hill there are many quartz reefs cropping out, indicating lodes. In the gullies leading from the hills prospecting for stream tin has led to good results. (Woods, 1886.)

**McKINLAY BLOCKS MINING SYNDICATE.**—Seven mineral claims, 560 acres, near Mount Wells.

**MARGARET CREEK GOLD MINE.**—This goldfield has been entirely mined by Chinese, and most wretchedly mined. It has all the indications of being a rich gold country. A network of dioritic dykes with quartz lodes suggests important mineral deposits. (Woods, 1886.)

**MOUNT SHOEBRIDGE TIN MINE.**—There are several parallel lodes containing a fine show of black tin ore, two or three of which have been uncovered to the extent of removing about a ton of the ore. (*Ibid.*) The lode, varying from 2ft. to 8ft. wide, has been followed to a depth of 150ft., and has been found to carry very rich deposits of tin, somewhat patchy, but the lode formation has been proved to be continuous to a depth of 180ft., with true walls. During 1889 the company completed the erection of crushing and concentrating machinery, and despatched over 50 tons of black oxide of tin to London, assaying on the average 65 to 68 per cent. of metallic tin. ("Northern Territory Almanac and Directory.")

**MOUNT WELLS TIN MINE.**—Situated between Yam Creek and the McKinlay River, this mine resembles the tin mines of Cornwall, but the tin in quality surpasses anything ever found outside Australia. There are two main lodes, and a shaft has been sunk and an adit driven 100ft. There is a large quantity of ore easily accessible. (Woods, 1886.) The "Northern Territory Almanac and Directory" gives particulars to the end of 1889. At the 230ft. level the contractors were still driving on the course of the lode, which is over 4ft. wide, and steady development is proceeding, and new stamper mills are to be erected shortly.

**NEATE'S GULLY GOLD MINE.**—A very good shoot of gold worked by Chinamen on tribute. On top of the ridges on each side the flat there are quartz reefs. The lode looks excellent. (Woods, 1886.)

**NORTH AUSTRALIAN MINING COMPANY.**—Locality of property, Burrundie, where a lease of 8,544 acres of land is held from the Crown for the purpose of mining for tin, silver, and gold. No further information obtainable.

**No. 11 SOUTH UNION GOLD CLAIM.**—The main shaft has been sunk over 200ft., and the 2,000 tons of stone passed through the battery has yielded satisfactory returns. ("N. T. Almanac and Directory.")

**PADDY'S HOLE.**—Mr. Benstead has been good enough to furnish the following information:—The discovery of gold at this place occurred in April, 1887, and the largest nugget found weighed 2ozs. 4dwts. Prospectors have worked in half-a-dozen gullies, but principally in those called the Kangaroo and Nuggetty Gullies. At the present time there are about forty men on the field, some of whom have done fairly well. About half the number are prospecting for alluvial gold, which is rough and coarse. It is probable that at the least 200ozs. have been sent away, and were there not so much difficulty in respect of water supply for washing, it is believed there would be a very satisfactory, if not large yield.

**PINDER'S HILL GOLD CLAIM** adjoins the Isabel. A shaft was sunk 70ft. and 124 tons of stone got, which yielded 169oz. of gold. Not now working. (Woods, 1886.)

**PINE CREEK**, ten miles south of the Union.—Amidst the quartz lodes, which are almost meridional in direction, there is a variety and extent of minerals which has few parallels in other countries—gold, silver, lead, tin, and copper. Only four claims now working. (1886.) Three hundred and sixty ounces was got from thirty tons of stone. This will give an idea what the country is. (*Ibid.*)

**SANDY CREEK**, a wide open valley, with gullies in the ranges, which have all been proved to be more or less auriferous, and some extremely rich. (*Ibid.*)

**SNADDEN'S CREEK TIN MINE.**—Situation, east of south of Mount Wells, ten miles. The ore is a coarse tin sand, with fragments of beautiful wood tin about an inch or so in diameter. The size of the fragments indicate veins at no great distance. (*Ibid.*)

**STAPLETON GOLD REEFS.**—The stone is said to be good, and when costs of carting and crushing have been cheapened it is believed these mines will be worked again. (1890.)

**SPRINGHILL GOLD CLAIM.**—It is said that about 8,000oz. of gold have been taken from this claim, very fine, and worth £3 17s. 3d. per ounce. The range is full of quartz reefs and leaders, none of which have been at all properly tested. (Woods, 1886.)

**UNION GOLD DISTRICT.**—Mr. John Harvey supplies the following particulars respecting this important discovery :—

This district, situated about 120 miles from the seaboard (with which it is connected by railway), has reefs which have been proved to extend nearly twenty miles, the Extended Union Mine being the most northern property worked, and the Pine Creek district is its southern termination. The mines occur on true fissure lodes in sandstone and slate country, bounded on the east by an immense range of granite. The railway running to the west of the line of reef is within easy distance of all the mines. About forty gold-mining leases have been taken up, the Prospectors' Claim being situated about the centre of the district. Acting upon the advice of mining experts, Messrs. Millar Brothers have purchased and secured more than half of this district, and are now actively employed in developing their southern properties. A shaft has been sunk on No. 10 South Union to a depth of 300ft., and the reef at that level was 12ft. wide, interbanded with black slate carrying gold. The early crushings made at the public battery from this claim gave a return of 1,357oz. from 266 tons. A 10-head battery is now erected, and the mine is connected by tramway with the railway. The labor employed on this mine, and indeed on all the mines, is Chinese. They are ready to take contracts for all mining work, and many of them are expert miners. The rate of wages is 6s. per day for dry work, and 7s. per day wet ground; and the managers speak in the highest terms of their plodding perseverance. The Messrs. Millar Brothers have a large number of hands employed on their leases, and are sinking a shaft with the intention of going down 500ft. on No. 5 south claim; where also a powerful battery is to be erected. At the Prospectors' and adjoining claims the cap of the reef was very rich; the first crushing gave over 800oz. from 10 tons, and crushings of 10oz., 20oz., and 30oz. for small parcels have been numerous. The South Union Company, adjoining the Prospectors' Claim, erected a Huntington mill, but this will now be replaced by a battery. There are five reefs proved to extend through their claims, and past crushings have given large returns. At the Alice Union Company's claims an immense outcrop of the lode appears on the surface, and has been proved to be 20ft. wide at a depth of 100ft., showing gold in the stone. The claims adjoining to the Alice Union are now being worked by a local company, and their 15-head battery will be erected about July next. The north leases are mostly held and worked by V. L. Solomon and W. Griffiths, and the reefs proved to extend through their claims are carrying good gold. Some of the other claims are worked by the Chinese on tribute, and 10oz. and 12oz. crushings have been recorded from a small reef on their No. 12 north claim. The great drawback to successful mining in this district in the past was the high price paid for cartage, ranging from £20 to £100 per ton; and also the high rate of wages paid to Europeans for labor, viz., 10s. per day and "found," equal to £5 per week. Now that the railway is constructed, the freight is about £2 per ton. Other districts now being worked for gold are the Howley, Grove Hill, Pine Creek, and Maud Creek; whilst some thousands of Chinese are at work on various alluvial fields.

**UNION GOLD MINES.**—The mines under this name may be said to be amongst the greatest and richest deposits of gold in the Northern Territory, and the whole line of country to include good reefs of payable stone. The caps gave wonderful crushings—60, 70, 80 ounces per ton; but the claims are idle, or nearly so, and have been abandoned one by one, but in no case for the want of good auriferous stone. The Union mines may be called the Sandhurst of the Northern Territory. (Woods, 1886.)

**ALICE UNION GOLD CLAIMS.**—Under date August 24th, 1889, Mr. John Harvey writes—The Alice Union proprietors have four leases, viz., The Lady Alice Pro-

spectors' Claim (now No. 1 North and No. 1 South), and Nos. 3 and 4 South. The Lady Alices reef traverses the four leases, and on the Prospectors' claim is from 12ft. to 6ft. wide; numerous shafts have been sunk, and crushings taken out. The reef has also been opened out on Nos. 3 and 4, and during the past six months, trial crushings have giving 1½ozs. to the ton. This is the same reef that is now being worked by Millar Bros. in No. 10 South; it is there, at 200ft. deep, 11ft. wide, composed of a dark-blue quartz interbanded by black slate, the whole carrying gold. The reef is nearly vertical, with good walls, and is a true fissure lode, between slate and quartzite country, and on the Alice Union No. 1 South lease a tunnel is now being driven to cut the lode at the depth of 150ft., which will give a large quantity of backs for crushing.

THE UNION PROSPECTORS' CLAIM, adjoining the Alice Union claims, gave 78ozs. to the ton for its first crushing, and innumerable crushings from the cap of the reef along the line have given 10ozs., 15ozs., and 20ozs. to the ton; but these crushings are phenomenal, and are what might be expected from the weathering down of a rich reef leaving the gold on its present cap. I, however, carefully examined the battery books during the past three years, and find that from the Lady Alice and Union reefs 3,464 tons have been crushed at a very primitive battery (and which the Rev. Mr. Woods, Professor Tate, and the Warden estimate loses 50 per cent. of the gold), that the yield was 6,616ozs., or 1oz. 12dwts. to the ton. This from a reef proved at 200ft. to be 11ft. wide, and being a true fissure lode, may be expected to extend to a very great depth, will compare with the average of any mining district in the world. The average of the South African field, in which the British public are investing millions of money, is only three-quarters of an ounce.

The following statement of crushings made at the public battery from the Union and Lady Alice reefs has been supplied by Mr. John Harvey:—

In 1886 the Warden reported 981 tons for 1,816ozs. 2dwts.

1887.											
Month.			Tons.			Result.			Month.		
						oz. dwt. gr.					
May	..	..	140½	..	..	105	18	11	September	..	..
June	..	..	153½	..	..	255	16	0	October	..	..
July	..	..	123½	..	..	213	2	0	November	..	..
August	..	..	134½	..	..	93	15	0	December	..	..

1888.											
January	..	..	95	..	..	212	5	10	August	..	..
March	..	..	100½	..	..	115	5	12	September	..	..
April	..	..	124½	..	..	178	18	0	October	..	..
May	..	..	92½	..	..	108	18	0	November	..	..
June	..	..	91½	..	..	143	5	0	December	..	..
July	..	..	53½	..	..	42	7	0			

1889.											
January	..	..	72	..	..	74	6	0	June	..	..
February	..	..	10	..	..	6	0	0	July	..	..
March	..	..	121	..	..	82	10	8	August	..	..
April	..	..	55	..	..	142	14	0			

Or 3,464 tons for 6,616ozs., being an average of 1oz. 12dwts. to the ton.

This battery is referred to by the Rev. J. E. Tennison Woods, Professor Tait, and the Warden of Goldfields as losing 50 per cent. of the gold.

WHEAL DANKS COPPER MINE.—This adjoins the Daly River Mine, and a considerable quantity of work has been done. The main shaft is (January, 1889) 180ft. deep, and levels are driven. Ores range up to 30 per cent., and some parcels have been sent away which have realized good prices. The property is now held by an English company. (Chief Warden Nash.)

**YAM CREEK.**—This is an extensive mineral or gold-bearing area, including the Margaret, Stuart's, Cement, Neale's, and many other creeks and gullies, from some of which remarkably rich results have been secured. (See the several mines named—Woods, 1886)

## GOLD PRODUCED IN THE NORTHERN TERRITORY.

Date.	Ounces.	Value. £
Up to the 31st of December, 1884 .....	71,356	264,598
Year ending December, 31st 1885 .....	19,606	70,450
Year ending December, 31st 1886 .....	17,489	63,139
Year ending December, 31st 1887 .....	18,864	68,775
Year ending December, 31st 1888 .....	9,713	34,802
Year ending December, 31st 1889 .....	13,956	47,339
	<hr/> 150,984	<hr/> £549,103

NOTE.—There have been numerous bands of Chinese at work on the alluvial diggings during the greater portion of the time included in this return, and it is known that they have obtained large quantities of gold; but the total amount that they have obtained cannot be guessed at even approximately.

## GEMS.

Garnets are very common in the sands of some of the creeks and rivers, and are also often seen embedded in the granite and metamorphic rocks of the Hale river region. Some time ago these gems, which were said to be Oriental rubies and considered very valuable, were collected in large quantities on the Maude, Florence, and Hale rivers, and sold in some cases for large prices, the sand being burrowed into and the garnets picked out by blacks. When, in course of time, people became convinced that the gems were not rubies, but really garnets, the industry ceased, and at the time of the visit of the Government Geologist none of the hundreds of claims which had been taken up were being worked. It is doubtful whether any true rubies have been found here associated with the garnets, although the rocks are favorable to the occurrence of these and other gems of a similar composition. Beryl, or aquamarine, as previously mentioned, occurs in quartz at Lindsay's Mica Mine. Some green stones, which may be beryls or emeralds, are said to have been found at Ruby Gap.

The following is a list of claims taken out at the time of the ruby excitement :—

**ELDER RUBY MINING COMPANY.**—Locality, the Hale or Elder river. Two hundred and forty acres are held under mineral licence from the Crown, a lease being applied for. In September, 1888, Mr. David Lindsay, F.R.G.S., reported an examination of the claims, and stated that he found all the blocks carried good stones.

**MAUDE RIVER RUBY MINING COMPANY.**—Locality, MacDonnell Ranges; area, six blocks, each 40 acres, leased from the Crown for ninety-nine years. The secretary (Mr. W. P. G. Joyner) states that besides Australian rubies, diamonds have been found, some being discovered in London among stones consigned by this Company to Messrs. Ashford & Brooks, and one was cut and found to be of very good color. Mr. D. Lindsay, F.R.G.S., has reported favorably of the claims.

**AUSTRALIAN RUBY COMPANY.**—Fourteen claims, each 80 acres, at MacDonnell Ranges. No particulars available.

**CAPECORN RUBY MINING COMPANY.**—Six mineral claims, near the Florence and Maude creeks.

**CENTRAL AUSTRALIAN EXPLORING AND PROSPECTING ASSOCIATION.**—Eight mineral claims, on the Tug, a tributary of the Hale river.

**EXCELSIOR RUBY COMPANY.**—Sixty acres, near Mount Pleasant, Hundred of Para Wirra.

**ESMERALDA RUBY SYNDICATE.**—Four 40-acre blocks on the Hale river.

**FLORENCE RIVER RUBY MINING COMPANY.**—Six blocks, each 40 acres, near the junction of the Maude and Florence rivers, adjoining the Oriental Ruby Company's property.

**GREAT MATRIX RUBY COMPANY.**—Seven mineral claims on the Hale river.

**HALE RIVER RUBY COMPANY.**—Five 40-acre mineral blocks, on Elder Creek, MacDonnell Ranges. The stones found up to date are of low quality.

**HART RANGES RUBY MINING COMPANY.**—Situate at Hart Ranges.

**JUNCTION RUBY MINING COMPANY.**—Six mineral claims, containing together 240 acres, on Maude Creek, near to its junction with the Florence.

**LIZZIE RIVER MINING SYNDICATE.**—Five mineral blocks, each 40 acres between the Florence and Maude rivers.

**MACDONNELL RANGES RUBY MINING COMPANY.**—Twelve mineral blocks, 480 acres, at MacDonnell Ranges, upon which six shallow shafts have been sunk.

**MID-AUSTRALIAN RUBY COMPANY.**—Eight mineral claims, 320 acres, near Alice Springs, on the Hales and Florence rivers.

**OLIVER'S RUBY COMPANY.**—Six mineral claims on the Maude river, containing 240 acres.

**ORIENTAL RUBY COMPANY.**—Six mineral claims, each 40 acres, on the Florence river.

**PEARSON'S EXTENDED RUBY AND PRECIOUS STONES COMPANY.**—Claims on Elder Creek and Hale river.

**PENNELL AND FLORENCE JUNCTION RUBY MINING COMPANY.**—Twenty mineral claims near the Florence river.

**ROSELLA RUBY COMPANY.**—Eight mineral blocks on the Florence river.

**ROSS RUBY COMPANY.**—Thirty-four mineral claims, each 80 acres, on the Hale river.

**SOUTH FLORENCE RUBY COMPANY.**—Eleven 40-acre mineral blocks on the Florence river.

**TELEGRAPH RUBY MINING COMPANY.**—Twelve mineral claims near the Florence river.



**WALLIS RUBY AND PRECIOUS STONES COMPANY.**—Two mineral claims, 80 acres, on the Hale river.

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**LINDSAY'S PROSPECTING COMPANY, LIMITED**, hold three 40-acre blocks, situated in the MacDonnell Ranges, N.T., from which they are extracting mica. It is associated with quartz, and, as far as can be seen on the surface, the deposit is about 30ft. wide, and outcrops on its course for a distance of about 30ft. The main outcrop carries blocks from 6in. to 15in. square. The deposit appears to be very large. Another outcrop included in this property shows sheets from 3in. to 4in. square. (A. Champion, secretary.)

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[The following items were received at too late a date for insertion in their proper place in the foregoing pages :—]

**GREAT BENOWIE COPPER AND SILVER MINING COMPANY.**—The property taken up by this company was 1,800 acres of Crown lands, and it contains about ten lodes, which strike east and west, with a width of 5ft. One shaft has been sunk to the depth of 100ft., and a drive has been put in a distance of 20ft., the country being granite. The ore readily dressed up to 20 per cent. Now gone into liquidation. (Mr. O'Connell, secretary.)

**HAMLEY MINING COMPANY, LIMITED.**—This company holds a lease of Crown lands adjacent to the Moonta Mine. The property contains six lodes, which strike 12° east of north, and have an average underlay of 3ft. per fathom. They vary in width from 1ft. to 6ft., with here and there deposits which go from 10ft. to 15ft. in width. There are nine shafts, and their several depths are 165, 120, 100, 90, 80, 65, 60, 40, and 30 fathoms, following the dip of the lode. The total length of drives is 2,550 fathoms, and crosscuts have been driven to the total extent of 250 fathoms. The matrix of the ore is quartz, and occasionally portions of the bed rock, the walls of the lodes being composed of porphyry. The ore is a chalcopyrite, from 20 to 30 per cent., and bornite 50 per cent., and the yield is from one to four tons per fathom. (Mr. J. S. Scott, secretary.)

**WARRA WARRA COPPER MINING SYNDICATE**—This property, held under ordinary mineral licence, is situated about twenty-two miles from the Warra Willa railway station, near Farina. Work was commenced vigorously in May, 1888, and in September and October of the same year twenty tons of ore were raised, which realised over £150. Owing to the heavy fall in the price of copper, work was suspended, but an effort is being made to recommence operations. (Mr. A. Bristowe, secretary.)

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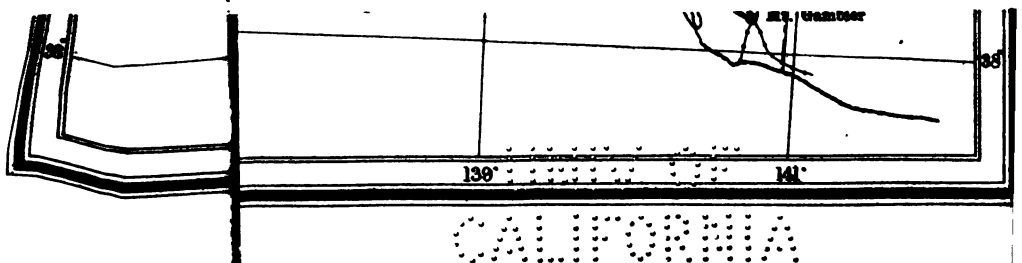
**NOTE.**—On page 122 a rule should have been inserted before "*Yudnamutana Gold Discovery*" marking the end of the list of Woodside mines.

# Return of the South Australia, Exported Annually. 139

Year.	Copper.		Gold.		Silver.		Tin.		Total Declared Value of all Mineral Exports Annually.
	Quantity.		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
	cwts.		oss.	£	oss.	£	cwts.	£	£
1840 ..	—		—	—	—	—	—	—	nil
1841 ..	—		—	—	—	—	—	—	390
1842 ..	—		—	—	—	—	—	—	nil
1843 ..	—		—	—	—	—	—	—	127
1844 ..	—		—	—	—	—	—	—	6,436
1845 ..	—		—	—	—	—	—	—	13,484
1846 ..	—		—	—	—	—	—	—	142,251
1847 ..	—		—	—	—	—	—	—	174,190
1848 ..	73		—	—	—	—	—	—	321,943
1849 ..	8,676		—	—	—	—	—	—	219,547
1850 ..	44,595		—	—	—	—	—	—	365,464
1851 ..	50,774		—	—	—	—	—	—	310,916
1852 ..	39,187		—	—	—	—	—	—	374,778
1853 ..	24,303		—	—	—	—	—	—	176,744
1854 ..	8,119		—	—	—	—	—	—	94,831
1855 ..	12,255		—	—	—	—	—	—	155,557
1856 ..	44,980		—	—	—	—	—	—	408,042
1857 ..	56,893		—	—	—	—	—	—	458,839
1858 ..	47,796		—	—	—	—	—	—	373,282
1859 ..	56,745		—	—	—	—	—	—	411,018
1860 ..	65,429		—	—	—	—	—	—	446,537
1861 ..	61,047		—	—	—	—	—	—	452,172
1862 ..	85,872		—	—	—	—	—	—	547,619
1863 ..	96,039		—	—	—	—	—	—	542,393
1864 ..	134,055		—	—	—	—	—	—	691,624
1865 ..	100,196		—	—	—	—	—	—	620,112
1866 ..	129,272		—	—	—	—	—	—	824,501
1867 ..	156,863		—	—	—	—	—	—	753,413
1868 ..	104,227		—	—	—	—	—	—	624,022
1869 ..	92,788		—	—	—	—	—	—	627,152
1870 ..	109,421		—	—	—	—	—	—	574,090
1871 ..	127,911		—	—	—	—	—	—	648,569
1872 ..	149,050		—	—	—	—	—	—	806,364
1873 ..	141,744		76½	292	—	—	—	—	770,590
1874 ..	132,587		1,111	4,175	—	—	—	—	700,323
1875 ..	136,835		1,802½	7,034	—	—	—	—	732,386
1876 ..	109,269		2,501	9,888	—	—	—	—	602,772
1877 ..	102,871		—	—	—	—	—	—	565,099
1878 ..	71,866		324	1,225	—	—	—	—	409,749
1879 ..	67,370		20	90	—	—	—	—	353,781
1880 ..	66,108		—	—	—	—	—	—	347,246
1881 ..	76,485		220	880	—	—	—	—	420,558
1882 ..	72,955		764	3,080	—	—	—	—	462,270
1883 ..	67,975		2,671	10,534	—	—	—	—	402,450
1884 ..	91,441		3,970	15,469	—	—	—	—	491,950
1885 ..	70,352		4,692	18,295	—	—	—	—	344,451
1886 ..	72,710		8,825	32,535	—	—	—	—	275,008
1887 ..	77,490		19,082	72,003	—	—	100	16	319,954
1888 ..	63,310		8,728	34,205	1,929	372	—	—	370,361
1889 ..	80,172		10,124	37,305	2,700	490	196	340	349,430
	3,307,106	1½	46,086	214,476	4,629	862	296	356	£20,114,785

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 value of..... 70









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